THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XCI. No. 2204.] LONDON, AUGUST 8, 1905. [57TH YEAR. PRICE 6d.

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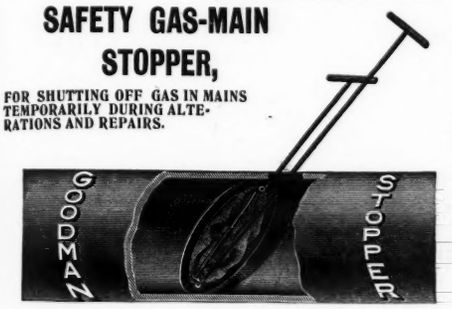

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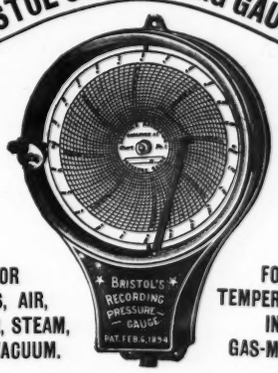

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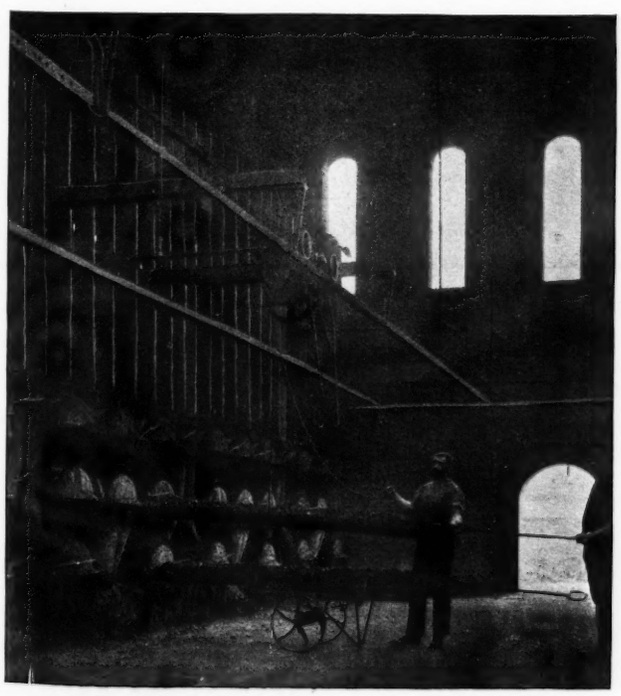

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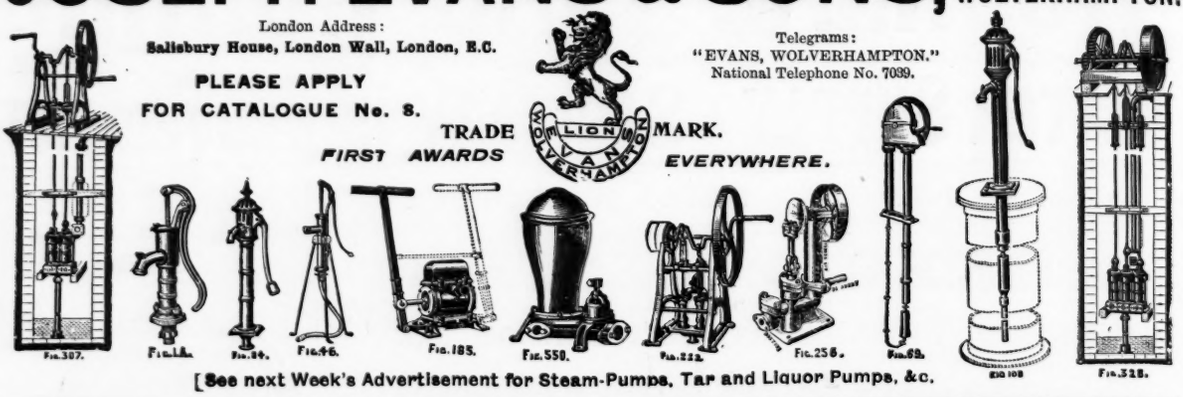

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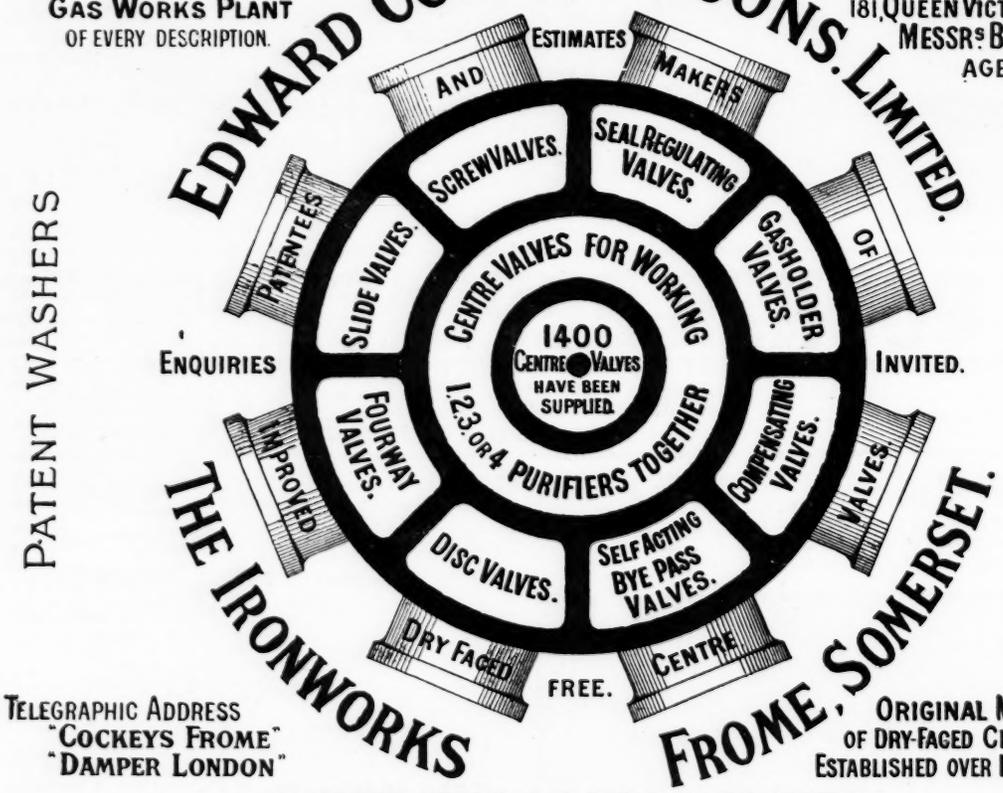

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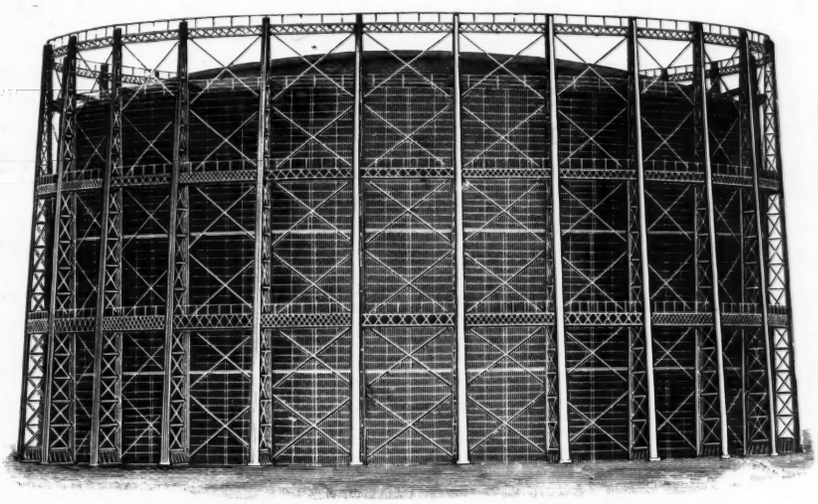

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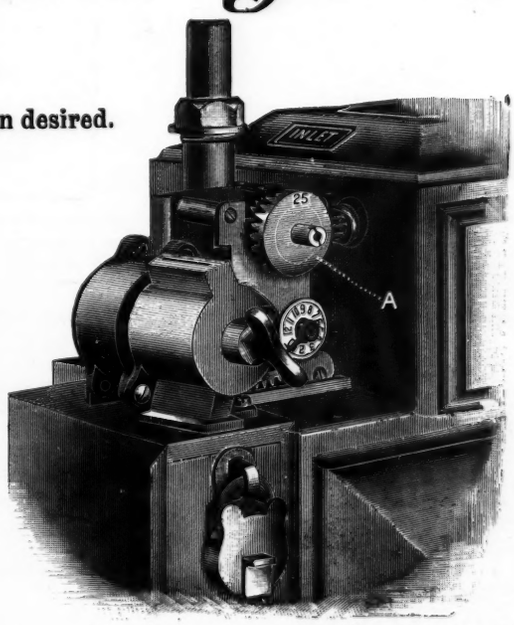

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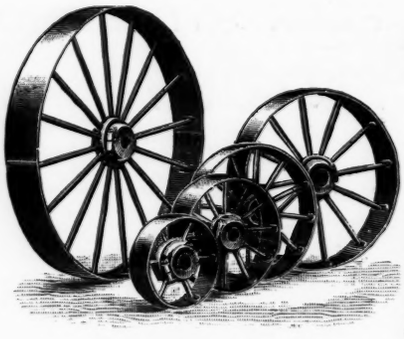

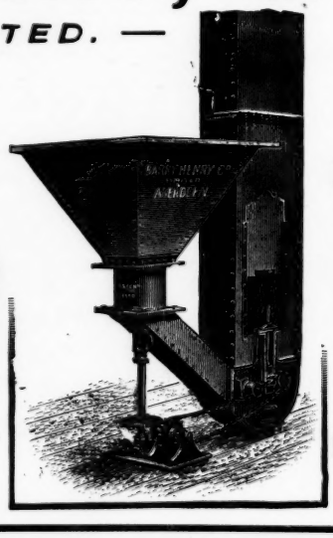

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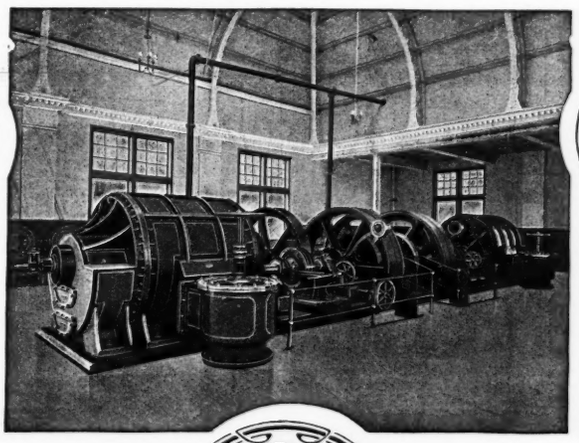

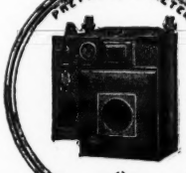

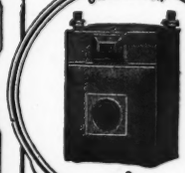

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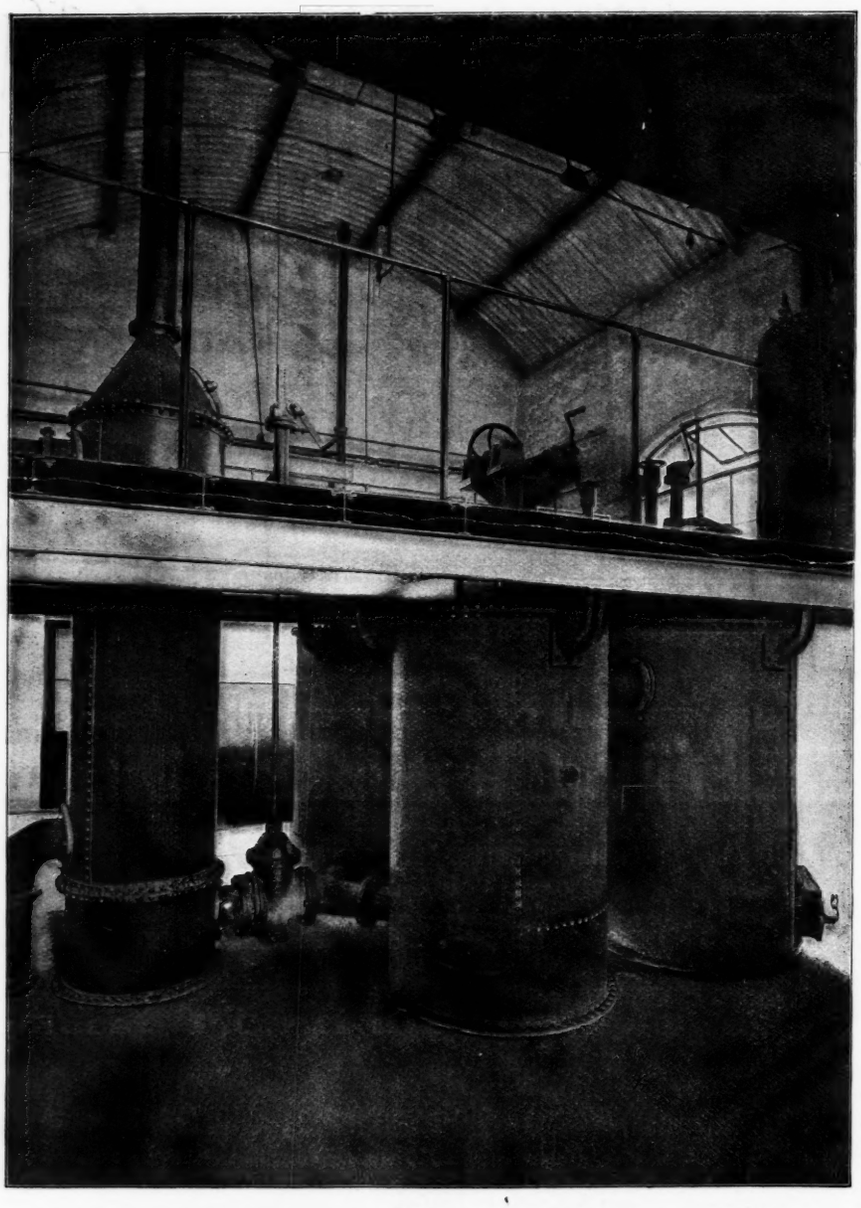

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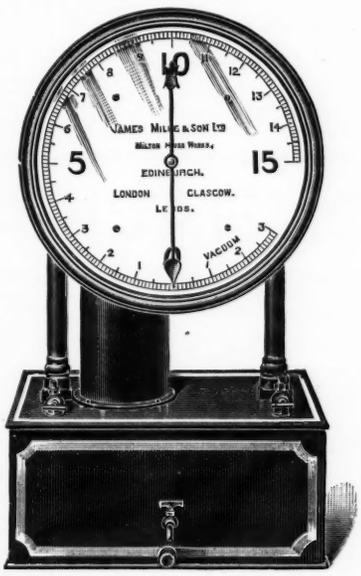

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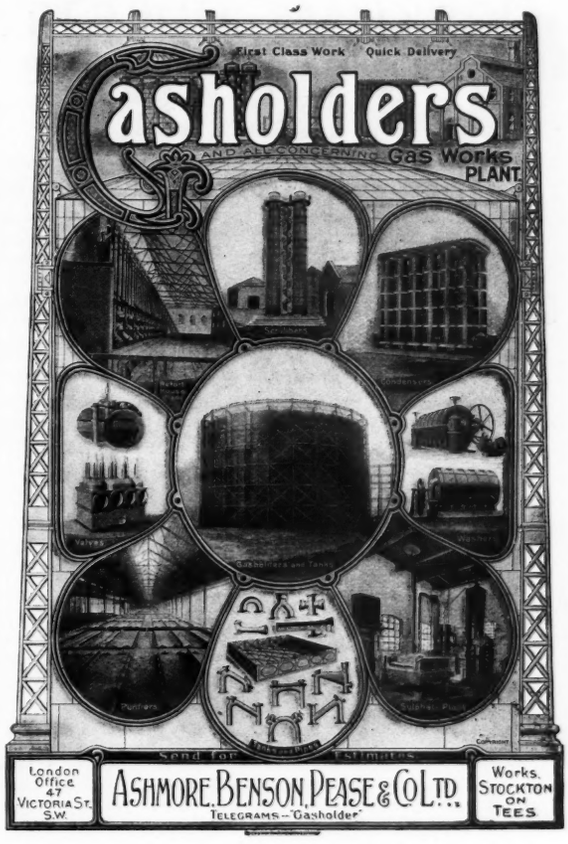

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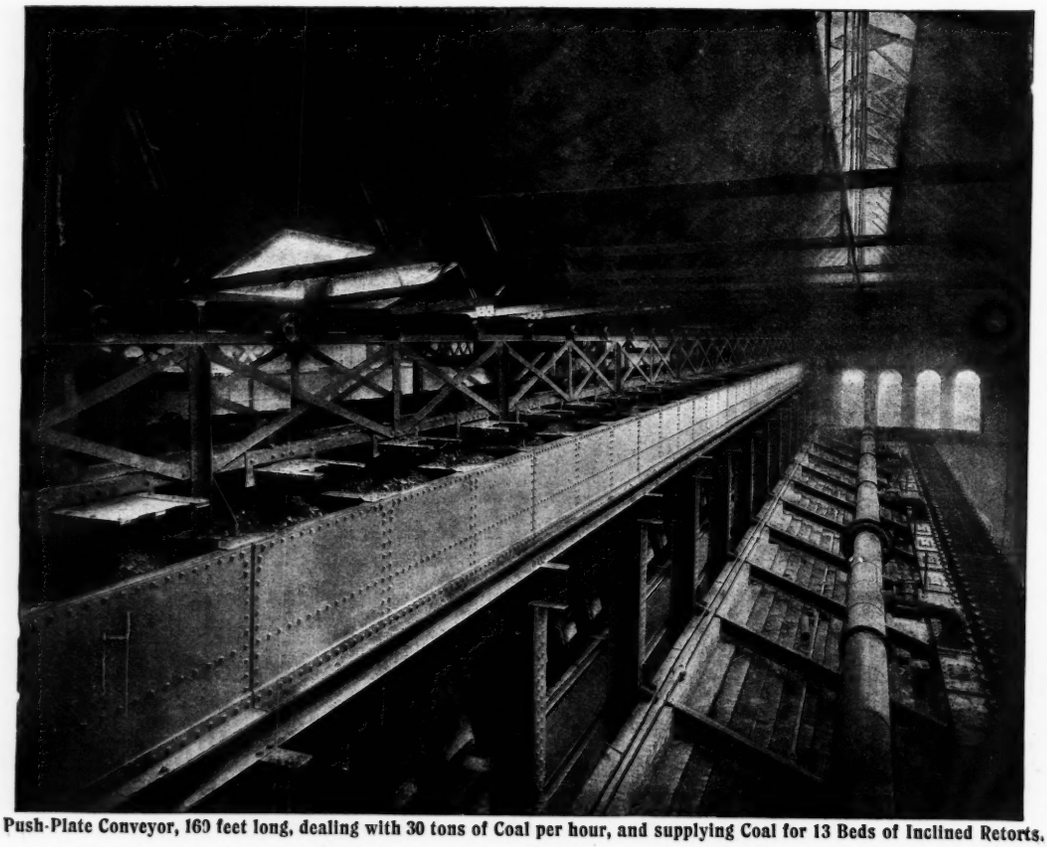

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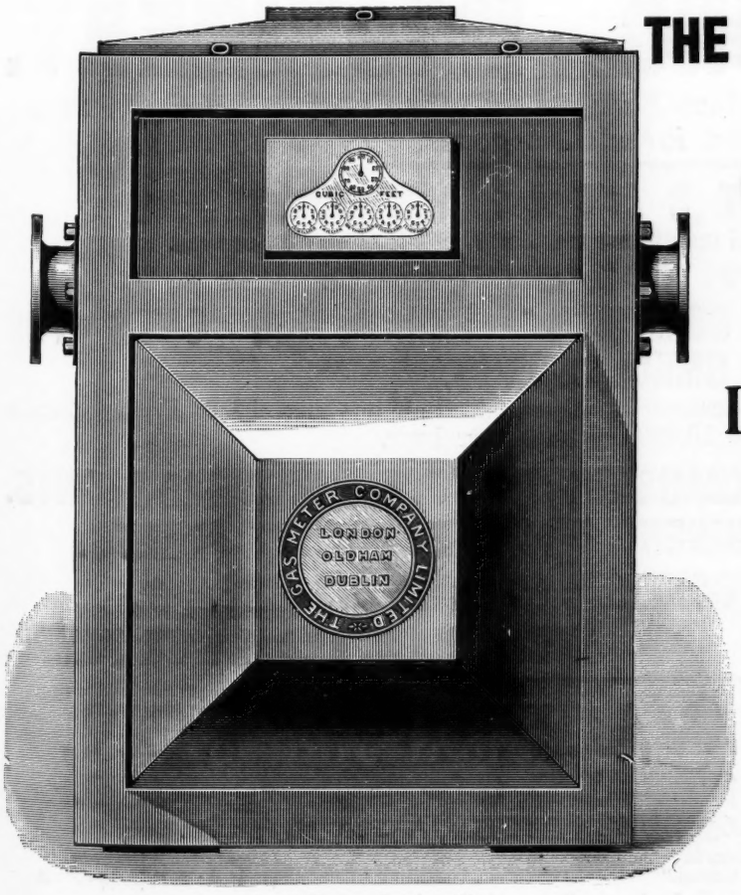

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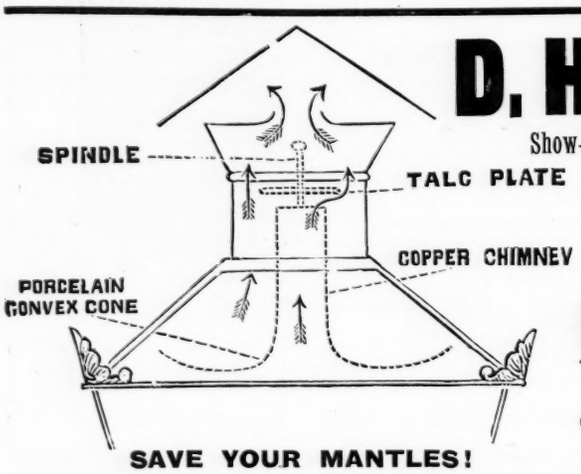

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CONTENTS.

EDITORIAL NOTES.

GAS, &c.—
The Meeting of the Gaslight and Coke Company 365
The Sulphate of Ammonia Committee . . 366
A Threatening Danger to Home Industry . 366
Institution of Gas-Works Contractors and Manufacturers—Brentford Gas Company—Some More Corporation Results—A Model Company—The Trouble of Stopped Service-Pipes—Claims in Patent Specifications—The London County Council and Trades Unionism—The Fair Contracts Clause 367

Gas Stock and Share Market 369
Notes from Westminster 369
Electric Lighting Memoranda 370
The Optical and Hygienic Value of Illuminants 371
Lessons in Gas Supply from Switzerland. . 372
Progress in Gas Purification. 372
Gas Supply on the Continent 372
The New Gasholder at Amsterdam. By J. van Rossum du Chattel 373
The Royal Arsenal (Woolwich) Gas-Works . 374
The Domestic Use of Illuminating Gas: Its Dangers and the Means of Avoiding Them. By H. Leffmann, M.D. 376
Inclined Retorts and Long Distance Distribution at St. Gall. By Herr H. Zollikofer 378
Stoppages in Meters and Service-Pipes . . 380

REGISTER OF PATENTS.

Gas-Burner with Internal Kindling Flame—Mannesmann, O. 384
Automatically Igniting and Extinguishing Gas-Lamps—Hinden, A. 384
Using Coal Gas as a Heating Agent in Stoves, Fire Places, and the Like—Noad, J., and Bell, H. A. 384
Sun Burners—Sugg, W. T. 385
Automatically Extinguishing and Re-Lighting Gas-Burners—Olsen, O. M. J., & Gates, W. 385
Patent Notices 385

LEGAL INTELLIGENCE.

Birmingham Assizes—New Conveyor Company, Limited, *v.* Gilbert Little—An Action for Return of Money Wrongfully Paid Away 386
Birmingham Assizes—Eveson Coal and Coke Company *v.* Grassmoor Colliery Company. Same *v.* Spooner 387
The Water Board and the Charge for Baths . 387

MISCELLANEOUS NEWS.

The Sulphate of Ammonia Committee . . 388
Ironmongery and Hardware Exhibition—The Incandescent Gas-Lighting Exhibits . . 388
Glasgow Corporation Gas Accounts . . . 388
Gaslight and Coke Company 389
Brentford Gas Company 391

MISCELLANEOUS NEWS (*continued*)—
Ascot District Gas Company 391
Provincial Gas and Water Companies . . 392
Stockport Corporation Gas Department . . 393
Warrington Corporation Gas Department . 394
Leigh (Lancs.) Gas and Water Supply . . 394
Stoke Corporation Gas Supply 394
Explosion at the Lichfield Gas-Works. . . 395
Gas and Electric Lighting in St. Pancras. . 395
The Plymouth Gas Company and their Employees 395
Difficulties of an English Water Company in Spain—An Ingenious Fraud 396
The "Lancet" on Thames Water. 397
Notes from Scotland 398
Coal Trade Reports 399
Current Sales of Gas Products 400
Stock and Share List 401

PARAGRAPHS.

A Wood-Stave Pipe-Line—A Gas-Engine Yacht 373
Gas and Oil Engines in Sweden—Irish Association of Gas Managers 377
Personal 383
Fatal Accident at the Market Drayton Gas-Works—New Joint Stock Companies . . 387
How Assessments are Settled 390
A Half-Lighted Village 393
Fatal Accident to a Gas Manager's Wife . . 400
New Water Supply for Woolacombe and Mortehoe 401

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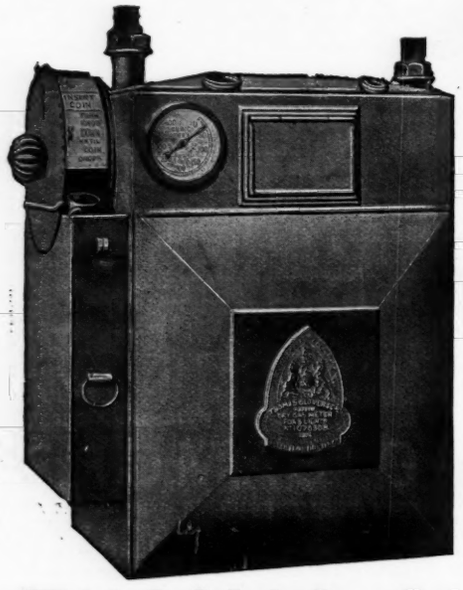

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. XCI., No. 2204.—TUESDAY, AUGUST 8, 1905.

EDITORIAL NOTES—GAS, &c.

The Meeting of the Gaslight and Coke Company.

EXTREME flatness was the distinguishing feature of the meeting of the Gaslight and Coke Company on Friday. The proprietors had not a great deal to be jubilant over, owing to the uncontrollable adverse circumstances of the half year; and, varying the general rule when results are not at their best, the hall was sparsely occupied. There was no complaining throughout the proceedings; but an absence of congratulation is at times equally expressive of feelings. However, there was manifest a great disappointment when it was learned, by the appearance of the Deputy-Governor (Mr. Howard Charles Ward) in the chair that the Governor (Sir William Makins) would not be presiding on the occasion; and the regret was the greater, as was shown by the endorsement of the sympathetic reference of Sir George Livesey later in the meeting, that his absence was occasioned by illness—then of some five weeks' duration. There may be times when one's convictions and views may not always coincide with those of another; but that is not a sane reason for—though we notice it is occasionally practised—vindictiveness, and its extension to personal reflection. Those who know Sir William from the proprietors' side of the Board table are aware of his attributes of devotion to duty and of courtesy, and of his inspiriting method and acumen in the conduct of the meetings. It was heard—and it was not a surprise—that Sir William has been a Director since 1872, and that this was the first time he had missed meeting the proprietors at their half-yearly assemblies since he became Governor in 1883. This, indeed, is an excellent record; and, on the first occasion of his absence, he was greatly missed. We join with those who sincerely hope that Sir William will be quickly restored to health and his customary vigour.

With his usual thoughtfulness, the Governor, though he was unable to be present, sent a written statement on the half-year's operations; and it was, after the introductory remarks of the Deputy-Governor, read by the General Manager (Mr. D. Milne Watson) with a clearness which reached the other end of a hall not by any means favoured with irreproachable acoustic properties. Sir William, however, had not a stirring tale to tell the proprietors; and his statement did little more than amplify the previously well appreciated outstanding features of the report and accounts. The circumstance under which the statement was prepared was certainly not one that favoured optimism; and combining that with the reduced figures produced by a depressed residuals market, a falling off in the sale of gas (which was, of course, as disappointing to the Governor as to the proprietors generally), and the 1d. concession to the consumers in the price of gas, together with a fairly substantial sum even for the Gaslight and Coke Company to be taken from the undivided balance, it is not remarkable that what Sir William had to address to the proprietors was not more cheerfully composed. In looking into the report last week, the usual information as to the accretion of consumers was missed; and the Governor furnished the information (excepting in regard to the ordinary consumers) in dealing with the capital account. The number of prepayment consumers has been augmented in the half year by more than 14,000; and the stoves sold and on hire by 15,000. These figures do not come up to those for the corresponding half of 1904; but, of course, just as in gas consumption and other business, the rate of increase is bound to be subject to fluctuations great and small. At the same time, anticipation of a special increase this year has not been gratified. But there is another way of looking at it, that, without the activity of the half year and the few weeks preceding it, the figures might not have been so good as they are.

Practically the same remark applies to the reduction of the price of gas by 1d. twelve months ago. Without the reduction, the decline of 1·8 per cent. in consumption would in all probability have been larger; and, as the Governor says, there is no doubt that it has been the means of retaining consumers. There was never a time when the competition with electricity in the Company's district was so severe as now; and the price of electricity is in several instances low. The Governor himself speaks of the "low price" of electricity in the area as one of the factors militating against the progress of the gas business. And in large parts of the Company's area what is wanted is a low price of gas to combat that competition; and a low price will be wanted more than ever in the future. Electricity is likely, through the Administrative County of London and District Electricity Supply Company, to be, within measurable time, competing with itself for certain purposes in those districts where agreements have not been made with the existing purveyors of electricity; and that competition will produce still lower prices. The Company are singular among gas undertakings in the vastness of the portion of their district where expense for private lighting is not always the first consideration; and there, whether the price of electricity be low or high—and it is expensive at the lowest of possible figures in comparison with incandescent gas lighting—there are people who will have it. But this does not generally apply; and the Governor's mention of low-priced electricity points to what is necessary on the part of the Company. The incandescent gas-burner, as the Company have shown London by some remarkable successes, can do much; but price also tells.

Without again commenting generally on the accounts, there are two or three points to which passing allusion may be made. The first is the reduction of more than £8000 in carbonizing wages; which brings the wages per 1000 cubic feet sold to the lowest point on record in the case of this Company. The Engineers are to be congratulated upon this. The effect of the capital redemption fund created by the Act of 1903 is shown in these accounts—£19,965 of stock has so far been cancelled, and £439 saved in dividend in the half year. The only other point is with regard to the rates. The quinquennial revaluations are now being made; and there is little doubt that the first result will be some heavy fighting—especially from the large Companies. There is more necessity than ever for resistance to the unreasonableness of local authorities in this direction, through shameful extravagance; and the proprietors of all industrial undertakings will in this give their respective Boards their full support. It was not without signs of satisfaction that the proprietors of the Gaslight and Coke Company heard the Governor's statement "that no effort will be spared by the "Company to obtain relief from the incubus which is so "fettering to the operations of the Company." Will the local authorities please note this? As to the future, the best piece of news the Governor could give was that lower prices were to be paid for coal; and there was the one gleam of cheerfulness when he said that he looked forward with confidence to a better state of things generally. The past year has had one particularly bright feature; and that has been the united action of the three Companies in resisting the infliction of unjust legislation and removing unnecessary and purposeless restriction. It was a graceful acknowledgment that Sir George Livesey made when he said that to Sir William Makins and Mr. Watson was largely due this cordial co-operation in Parliament of the Companies.

As to the final paragraph of last week's notice of the Company's affairs, we are informed, on the best of authority, that the rumour of the contemplated retirement of the Deputy-Governor is without foundation. In half-a-dozen different directions, the statement was voluntarily made; and we gave it as nothing more than a rumour. Mr. Howard Charles Ward, it is a pleasure to see, is in the best of health; and we are assured that he has no intention of taking the predicted step.

Sulphate of Ammonia Committee.

THE sulphate of ammonia market during the last financial year of the Sulphate of Ammonia Committee, which ended on June 30, has been kindly disposed towards gas undertakings, and they have reason to be very well satisfied with it, in view of the fact that other residuals have not been in anything like good form. In the closing quarter of last year, prices made a very decent ascent; and the end of the year and the beginning of the present one saw them holding up at the best figures recorded for some time past. Then a drooping tendency set in; and to-day we have prices (while better than they were a year ago) short of the high figures that ruled six months since. But these high prices, it is gathered from the report of the Sulphate of Ammonia Committee, have somewhat retarded consumption among agriculturists. Even if present prices are maintained or are exceeded, the little aloofness on the part of the farmer can be but a temporary matter. He has shown himself open to conviction in the past; and the Committee have been the centre of the educational influence which has resulted in his conviction and conversion so far. Their work, of course, has been of a special character, and such as no producer can undertake single-handed. It is demonstration, and the results of reliable demonstration, on different soils that the agriculturist wants; and this has been given him, and will continue to be given him, through the Committee. There must be no cessation in this direction while the agents of other fertilizers are so industriously at work, and spending money—in one case lavishly—in the effort to improve the market for their particular commodity. Any relaxation upon the one side must be to the advantage of the other. What the Sulphate Committee have now to aim at is to drive home to the farmer the fact that, even at the prices that we have seen during the past six months or so, sulphate is, to use their own words, "still the cheapest and the best form of "nitrogen."

The methods of the Committee in prosecuting their particular mission during the year have been much the same as in previous ones; but in the past twelve months there has been no outlay on exhibitions. Of course, the Committee know best whether the results of exhibiting in this manner have or have not justified the expenditure; but we hope nothing will be dropped from their modes of action that have been, or are likely to be, of any material service to producers. The only criticism that can be made on the report has connection with this matter. Owing to the saving of expenditure in this direction, and in consequence of an increase in subscriptions through new members and a consequent growth in the tonnage, the Committee have reduced the amount of the subscriptions from 5d. to 4d. per ton. We are not quite persuaded that this is wise, as, in view of the peculiar character of the work in which the Committee are engaged—it being at once aggressive, educational, demonstrative, and so on—and the affluence of the principal combination against which they have to operate, it would not have been amiss to, for a time, have utilized any surplus in building up a reserve fund. The penny reduction per ton is a matter of little moment, seeing that those who produce the largest quantity of sulphate are those who can best afford to pay, and who reap the greatest benefit. The increase last year in subscribers and tonnage is sufficient proof, too, that the difference of 1d. per ton has really no bearing upon the question of the securing of additional subscribers and the extension by this means of the Committee's influence. Moreover, when the sulphate market is in such condition as it has been latterly and is now, there certainly seems to be less reason still for allowing the subscription to recede.

There is one other matter. The Committee have yet a large field from which to get subscribers; and annually we have taken the opportunity, when noticing their report, of urging upon sulphate of ammonia producers the claims of the Committee for the utmost co-operation. If the estimates of the production of sulphate of ammonia in the United Kingdom for last year are reliable, we make out that there are at least 100,000 tons still unrepresented by subscribers. The production of sulphate of ammonia by iron, shale, coke and carbonizing works, and gas producer plant is slowly but surely on the increase; and their combined output represents considerably more than one-third of the total. Of course, producers in these closely connected industries occupy common ground with gas undertakings in this matter of maintaining and improving the value of sulphate of ammonia; but it is as well that those who control gas undertakings which have not been enrolled among the subscribers should note the statement in the report that during the year 31 new members have joined, "including "the proprietors of several important iron-works and coke-"oven plants." The Committee regard these results of the renewed efforts made to increase the membership as very satisfactory; but, as the principal object of increasing membership is to swell the funds, we cannot see why the penny per ton has been knocked off the subscription.

A Threatening Danger to Home Industry.

ARE we in this country drifting towards the evil of gigantic industrial syndicates and trusts? The observant man can give but one answer to the question—and that in the affirmative; and the same man will devoutly hope that the tide will be turned, by universal opposition, before any great mischief is done. The emissaries of syndicate and trust are actively at work; and already certain not unimportant branches of business are largely controlled by huge concerns or combinations, with a capital-backing provided by a few men of considerable wealth. Considering this, one may well put the question, *Cui bono?* and find a fitting answer in the antecedent statement. Such concerns and combinations are mischievous in that they prevent the free employment of the money of the small capitalist; and they also, in no inconsiderable measure, exercise a coercive influence on the industries with which they do business, whether buying or selling. Owing to their magnitude, no one can afford to offend; and they domineer in all directions—to their own advantage, and to the disadvantage of others. No one need look farther for illustration than to what has been transpiring in connection with the Administrative County of London and District Electricity Supply Company. This Company are endeavouring to secure at the time this article is being written, the electricity power supply of industrial London and an extensive area surrounding; and even now they have agreements in their possession which—if their Bill receives the Royal Assent, and the Government Departments concerned have no objection to the arrangements—will practically give them the monopoly of furnishing electricity to considerable parts of London. From their own point of view, the start in their concentrating endeavours was not a bad one. People, however, must be blind if they cannot see that, in process of time, this Administrative Company, clothed with the extraordinary powers they are asking for, will for half a century or so be the masters of the electricity situation in London and many of its important suburbs. In short, Parliament will, by allowing the Bill to go through, be creating one of the omnipotents of the electrical world, and its dominion will not be beneficial to the electrical industry generally, nor to the free circulation of capital in that direction.

The restraint placed upon commercial freedom by such huge concerns, there can be no doubt is bad for a country. Bad as it is, however, when the princes of wealth who make the ways of these syndicates, trusts, or combines, an easy matter are our compatriots, it is worse when the concerns are engineered in this country by men of other nationalities, and the riches made here go to profit their own countries. American finance and energy have been operating very industriously in London, as is seen, for example, in electrification work and in the shipping world. We know sufficient of the rottenness, corruption, and overbearing power of certain American trusts, syndicates, and so forth to piously hope that the trade and commerce of this country may be kept altogether free from such baleful influence. What has happened in America appears to be fast developing in Germany. That country, too, has already secured a strong foothold in the native realms of British trade, and a matter of modern growth and seriousness is the activity of the Continent in actually purchasing some of the important steam-coal producing mines in Wales. While our own Government disclaim all but a superficial knowledge of these things, the daily papers give it as a fact that a Syndicate from Germany—our great industrial competitor—has been quietly annexing by purchase a coal-yielding estate in Wales of some 6000 acres. And this does not appear to be an isolated instance of the foreign invasion of our coal-producing territory. Coal is the life-spring of this industrial land of ours; and other countries are being allowed without opposition to come in and obtain a controlling interest in that life-spring! It is not right. The "Law Times" tells

us there is nothing in the Companies' Acts to preclude such a transaction; and so possibly the case might be brought within the recognized rules of public policy. Our coal is finding its way to foreign countries even now all too rapidly. According to the returns for the past six months, we have only imported 8656 tons of coal, coke, and patent fuel; but we have exported no less than 12,641,836 tons. True, this is a decrease on the corresponding periods of the preceding two years; but that may be only a temporary reduction. With Continental purchases of coal-bearing lands and mines, the figures will not be long in ascending to a different level. There is certainly much in the trend of events, if only we will look about us and properly assay the indications of the times, to engage very serious consideration.

To return to the general subject. Syndicates and huge combinations may for a time be productive of general benefit; but in the end the original object of the promoters is attained, and it is the consumer who feels its effect. Germany has been mentioned as having had various branches of its industry given up to Syndicates. Consul-General Oppenheimer places to the credit of this syndication the lifting of the cloud of depression in trade which followed the boom in Germany of 1899-1900. The Syndicates, he tells us, have prevented an over-production, and have thereby made it possible to obtain for the production "appropriate prices." This balancing policy undoubtedly saved Germany after the boom from a real crisis which would otherwise have been unavoidable; for industry generally gained sufficient time to prepare for the altered aspect of the markets. Yet it cannot be denied that these Syndicates contain dangers for production and consumption alike. The German consumer finds that prices, generally speaking, remain higher—the rise in prices being facilitated to a great extent by the Customs duties; and independent commerce is being more and more pushed back by the syndicated selling bureaux. The traffic in coal is mentioned as an instance by the Consul-General. It can no longer be called free or independent, unless the coal dealer has abandoned German for foreign coal. Is this the ground for the mysterious purchase by German money of Welsh coal-mines? Already we suffer quite sufficiently by the traffic of other countries, without being made to further suffer by the internal pressure of their commercial operations. In our own little way, we have thorium controlled by a Syndicate in Germany; and intelligence reached us some time since of the amalgamation in that country of at least two important incandescent mantle houses who do a large export trade. We do not like the narrowing of the commercial control of the goods on which we depend in any direction, and there must be as much opposition to it as possible.

The signs of the times, speaking now generally, bode no good to several of our industries. And it is earnestly hoped that in this country the industrial base will not be allowed to be reduced, and commerce governed, by large Syndicates, Trusts, Combines, or by whatever other name they may be known. They are not liked; and we want none of them.

Institution of Gas-Works Contractors and Manufacturers.

On inquiry of Mr. Charles Clare, the Chairman of the Committee appointed at the last general meeting held by the contractors and manufacturers of the gas industry, we learn that they are nearing the end of their deliberations concerning the suggested organization. It will not, however, be expedient to call a meeting of those interested to consider the proposals until after the holiday season is well over, in order to get as representative a gathering as possible; and therefore it may not be until the autumn that we shall see whether the labours of the Committee are to bear fruit. This much may be said, that, if careful consideration, a complete threshing out of debateable points, and time expended, ever deserved the recompense of a unanimous acceptance of recommendations, then this Committee should have that recompense. With them, it has not been a case of a prime mover and a tame agreement with his views; but every knotty question has been worked at by the members until concurrence has been attained. There are, we understand, only one or two outstanding questions which are now under consideration; and later on, in good time before the general meeting is called, circulars will be issued conveying the recommendations and scheme, so that they can be well digested before being submitted to the vote.

Brentford Gas Company.

There was quite a cheerful tone about the proceedings at the half-yearly meeting on Friday of the Brentford Gas Company; and there was good cause, for the Chairman (Mr. Howard Charles Ward) had an account to present to the proprietors that was bound to have a warm welcome. The Company have been working throughout the six months under the 2d. reduction that was made in the price of gas at Lady-day last year; but in spite of this, the poor condition of the residuals market, and the liberal interpretation by the Board of their duty in charging depreciation, sufficient profit was made to pay a ½ per cent. more dividend, and still to have a surplus of £1171. The new outlets for consumption continue to increase; so that there is every prospect of an amount of profit continuing to be made, unless there is a further shrinkage of residuals values, that will meet the dividend on the higher scale without having to touch the undivided balance. Some comparative figures that the Chairman also produced as to the capital employed tell their own tale of careful management. Per ton of coal carbonized, the capital has decreased since 1875 from £7 18s. 2d. to £5 4s. 5d., and per 1000 cubic feet of gas sold from 18s. 9d. to 10s. 2d., or, deducting the premium capital, to 8s. 9d. The last decade holds the record for diminution in this respect; and the 10s. 2d. is below the average for the dozen Suburban Companies quoted in "Field's Analysis" for 1904. There is ground in the results of the working for the warmest compliments being paid both to the Board and the Engineer (Mr. James Husband), and also for Mr. Ward's plaint of the want of appreciation on the part of the Stock Exchange of the Company's stock as compared with that of certain other Companies, who, paying a lower dividend, have a higher market value. But the difficulty is to find Brentford stock on the market.

Some More Corporation Results.

The Corporation gas undertakings whose working results for the past year are published in to-day's number of the "JOURNAL" have, as is only to be expected, much in common with most of those that have already been noticed. That is to say, there has been experienced a substantial falling off in the value of residuals, which has not been counterbalanced by increased output of gas. At Leigh, the decrease in the quantity of gas sold is equal to 2·35 per cent., although the number of consumers increased during the year by 286, or 4·18 per cent.; the explanation of the falling off being the familiar one—the more general adoption of incandescent lighting. The need for increasing the consumption has led the Engineer (Mr. James Gibson) to suggest the advisability of considering the question of abolishing the whole of the rents for cookers; his opinion being that the increased output that would result, together with the saving that would be effected in the item of fixing and re-fixing stoves, would fully compensate for the loss of revenue now derived from these rents. There is, of course, a very heavy shrinkage in the net profit—from £3057 to £958—but the ratepayers generally have no cause to complain, as this figure is arrived at after paying over to the public lighting rate £1049 by supplying gas to the street-lamps at net cost—1s. 2d. per 1000 cubic feet, instead of 2s. 8d., as is paid by other large consumers. At Stoke, on the other hand, the profit last year was about the highest on record; there having been an increase of nearly 2 per cent. in the make of gas, although the residuals realized only 58·62 per cent. of the cost of the coal, against 64·52 per cent. in the previous year. Alderman Geen has now been Chairman of the Gas Committee for a period of ten years; and it was therefore only natural that he should, when giving the Council the result of the past twelve months' working, refer with some satisfaction to the progress that has been made since he first took up this position. The record is a cheerful one; for in the ten years the number of consumers has more than doubled, while there has been an increase of 46 per cent. in the make of gas. At Warrington, Mr. W. S. Haddock reports that the meters show an increased make of some 5 million cubic feet, and a decreased sale of about 3 million feet; but this discrepancy makes him suspicious of the truthfulness of his station meter. A reduction has been effected in the cost of gas into the holders, and also to the consumers' meters. Residuals returned a very much smaller amount; but, on the other hand, large savings were effected in the cost of coal and other items of expenditure—more than sufficient to counterbalance the reduction in revenue.

A Model Company.

It is unnecessary at this time of day to say anything about the good relations existing between the Plymouth and Stonehouse Gas Company and their employees. For several years past, eloquent testimony has been borne to the fact that the workmen and the management of the Company have arrived at a thorough understanding, and that the business is being carried on in the most harmonious and pleasant manner. The annual outing to which the Directors invite the workmen and their wives is not only evidence of the good spirit which prevails, but affords an opportunity for the meeting together of those connected with the different branches of the undertaking, as well as the veterans now past active service. The key-note of such gatherings, and, indeed, of the whole success of the Company in its dealings with its workmen, is that of sympathy. There was nothing so apparent in the speeches of those who voiced the opinions of the workmen at last week's excursion, of which an account appears elsewhere, as their appreciation of the fact that those who control the Company endeavour to understand them, and really do sympathize with their needs. Modern industrial conditions no doubt tend to raise barriers between capital and labour. The old relations between master and man cannot exist in works which employ hundreds of men of different grades, and whose head scarcely knows the faces, much less the circumstances and the conditions, of those engaged under him. It is, however, quite possible, even in these circumstances, to create that bond of sympathy which is the surest guarantee of co-operation between the various classes on whom the prosperity of the works depends. At the Plymouth Gas-Works, there is evidently no impassable barrier between the office or board-room and the retort-house or coke-yard. If a man has a grievance, he is sure of a hearing and of redress if redress is possible. If he is in need of help or sympathy, he knows where to go for it; while if age is stealing on he can still look forward to the future without dismay, because he knows that faithful service will meet with something more substantial than the cold comfort of the workhouse. The Plymouth Gas Company have established themselves as the model body of employers in their district; and they are to be congratulated on having attained this position.

The Trouble of Stopped Service-Pipes.

Although it is not usual for the thoughts of gas managers to be turned in the month of August to frozen and obstructed services and the troubles arising therefrom, it may not be unprofitable for their attention to be called to the paper read by Mr. Irvin Butterworth, the President and General Manager of the Grand Rapids (Mich.) Gas Company, at the annual meeting of the Western Gas Association, which, with an epitome of the remarks made thereon, will be found in another part of the "JOURNAL." The author passed in review seven methods which have been tried for obviating the troubles referred to, all, with one exception, being based upon the principle of drying the gas; the remaining system consisting in the reduction of the freezing-point of its contained vapours by the admixture of the vapour of alcohol. Mr. Butterworth came to the conclusion that drying the gas by means of quicklime—the method suggested by M. Brémond nearly thirty years ago—would be much cheaper than treating it with alcohol, the method generally adopted in Europe. His individual opinion, however, was that the air condensation method would be the cheapest of all, both in first cost and in operation; but his experiments and investigations so far do not warrant him in stating this as a definite and positive conclusion. The discussion on the paper brought out some interesting points. For example, while the drying of the gas is attended by certain good results in some respects, it was shown to be detrimental in others. One speaker called attention to the destructive action of dry gas on the diaphragms of meters, which were stated to be "bleached," and the leathers to be "leaking like a sieve." Another point raised was the possibility of the condensing apparatus placed on the gasholder outlet going wrong and cutting off the supply to the town, which would, of course, cause a great deal more inconvenience, and certainly would be attended with more danger, than the stoppage of a number of separate services. Mr. Butterworth was disinclined to entertain the idea of such a calamity as that first mentioned. However, it was considered that the whole subject would bear further investigation; and it was suggested by the President that the author should continue his experiments, and report the result to the next meeting of the Association. This it may be hoped he will be able to do, for the benefit not only of his colleagues in America, but of those on this side the Atlantic.

Claims in Patent Specifications.

Those whose powers of invention lead them to have business relations with the Patent Office will be interested to learn of a decision given by the Law Officers last month on an appeal as to the meaning of the words "clear and succinct" in No. 4 of the Patents Rules, 1905. This rule, it may be mentioned, reads as follows: "The statement of the invention claimed with which a complete specification must end shall be clear and succinct, as well as separate and distinct from the body of the specification." The decision was given by the Attorney-General, who remarked that some such rule as this was necessary as well for the protection of the public as for the convenience of those who had to do with the administration of the Patent Law. There was no desire to lay it down that the fact of there being a number of claims constituted an infringement of the rule, for a specification might be such that there were a great many claims, separate in their nature, which were justifiably made under it. So long as the statement of each claim was in itself clear and succinct, and so long as there was an absence of repetition in the separate claims, the Law Officers did not think that there was necessarily any infringement of the rule, merely owing to the fact that there were a great many claims, so that the portion of the specification containing these claims was somewhat lengthy. In the particular case with regard to which the decision was given, however, it was held that, without any prejudice whatever to the applicant, the claims might have been very much reduced in number, with the result that a much clearer idea of the ground which the applicant really desired to cover would be conveyed to all who had to do with the specification. The Attorney-General said that an attempt had been made to deal with every possible contingency; and he deprecated very much the multiplication of claims that arose from the system (which seemed to him to have prevailed in America) of endeavouring to do this. He thought that this did not result in clearness, and that the system of claims which was more familiar in this country was clearer in the result. The Solicitor-General agreed that the mere number of claims would not necessarily constitute an infringement of the rule, supposing them to be really and substantially separate; but, on the other hand, though each claim might in itself be clear and succinct, if the claims were not really and substantially separate he thought they would come within the rule, and would not, taken as a whole, be clear and succinct.

The London County Council and Trades Unionism.

Our contemporary the "Financial Times" has lately been devoting a considerable amount of space to a series of articles on London County Council Finance; and in one of these the author, Mr. W. R. Lawson, deals very fully with the question of the effect on working men generally of the present policy of municipalities with regard to labour. He begins by remarking that one of the most plausible of the many excuses offered for municipal extravagance is that most of the money is spent on labour, and, consequently, the working classes get the chief benefit of it; but though there might be something in the argument if the working classes as a whole benefited by the high wages paid to municipal employees and had no rates to pay, neither of these hypotheses is correct. On the contrary, he is of opinion that the real effect of the fancy wages and exceptional favours enjoyed by municipal employees is not to benefit the working classes as a whole, but rather the reverse. They create a privileged class, the cost of which has to be borne by the non-privileged; and in proportion as this privileged class obtains more than a fair share of the labour fund of the country, the non-privileged must receive less than a fair share. After stating that it can no longer be doubted that there is some essential connection between the extravagant labour bills of our municipal authorities and the growing dearth of private employment, and that it is fallacious to assume that it matters little to the working classes whether rates rise or fall, Mr. Lawson deals with the part that the Trade Unions have taken in bringing about the existing condition of affairs. The London County Council, he says, who from their birth have been more

or less under the control of Trade Union wire-pullers, have now given themselves over bound hand and foot to the Trade Unionists; and in proof of this he cites the remarkable advances that have taken place in the rates of wages paid by them, and the adoption of the fair-wages clause for contracts—to say nothing of the Works Department, which was started with the object of allowing the Council to carry out their own work, and so be independent of contractors. Mr. Lawson concludes his article by remarking that the late Lord Farrer (then Sir Thomas Farrer), though a member of the Council thirteen years ago, when the clause compelling contractors "to sign a declaration that they pay the Trades Union rates of wages and observe the hours of labour and conditions recognized by the Trades Unions in the place or places where the contract is executed" was passed, did not by any means approve of the surrender. Not only did he oppose it strongly in the Council, but he adopted the unusual course of printing and circulating a memorandum exposing its dangerous tendency, in the course of which he said: "The Council will, no doubt, be a gigantic employer of labour, and for purposes connected with labour it will lose its independence; it will be run by the Trades Unions, and will be bound hand and foot to obey their orders."

The Fair Contracts Clause.

The fair contracts clause—*i.e.*, a clause to ensure that contractors pay the standard or Trades Union rate of wages prevailing in the district—has, of course, been much in evidence of late years in connection with municipal business; and, strangely enough, a few days before the article above referred to appeared in the "Financial Times" the subject was discussed at some length by the Huddersfield County Borough Council, a member of which body moved a long resolution having for its object to ensure that in all contracts entered into by the Corporation the principle should be adopted of paying working men Trades Union wages. Ultimately—after some weighty arguments against the adoption of the clause had been adduced—the motion was defeated by the narrow majority of one vote. One member said he objected to the resolution because it was seeking to help a class of workmen—Trade Unionists—who could help themselves, and also because the Corporation should be no party to interfering with private concerns. If, however, the Council did legislate, they should do so in favour of the weak. Parliament had been considering how they could draw back within the circle of employment a large number of aged people who had been seriously affected by the passing of the Workmen's Compensation Act; and he hoped that Council would do nothing that would make it difficult for aged men and women to earn their bread honestly. He further pointed out that Bradford, who had adopted the clause, were not satisfied with it; and that Doncaster had recently put it aside. Another member said he was inclined to think that it would be impossible to apply the resolution to the Tramways, Electricity, and Gas Committees; while still another said that at present all that the Committees asked regarding firms who tendered for any work was, "Is the firm a good one?" and they got along very well. Salford, on the other hand, has a fair contracts clause; and judging by some remarks made at last week's meeting of the Town Council, it has not invariably been found to work satisfactorily. It appears that some months ago a complaint was made that the Westinghouse Company, who had undertaken a Corporation contract, were not in some cases paying the Trade Union rate of wages; but after a full investigation a Sub-Committee reported that the allegations had not been proved, and recommended the Council not to cancel the contract. This, however, did not satisfy the Labour members, one of whom, at the meeting referred to, moved the adoption of a minority report of the Sub-Committee to the effect that the Company did not come within the conditions imposed by the fair contracts clause, and that therefore the contract should be cancelled. This was defeated by a large majority; it being urged that it was outside the province of the Council to decide matters of dispute as to conditions of labour, and that the Council were being made a "stalking-horse" by means of which the Labour party were seeking to settle their differences with the employers. One member pointed out that charges of this kind were continually being made, and when they were investigated they were never proved. "We are," he remarked, "damning the reputation of many firms in Salford by this procedure."

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 401.)

Business on the Stock Exchange last week was just such as might be expected at the time of year—a short week with a closed Saturday and a Bank Holiday Monday to follow. The chief thought was to close down and limit one's commitments, lest a surprise be in store to upset calculations before the re-opening. Thus, although the feeling was rather cheerful at the outset, yet gradually, as the realization process began to work, prices began to shrink. And, with the volume of business contracting from day to day, so things grew duller and duller. The political aspect, too, was not calculated to cheer; for the prospect of peace seemed to be receding. The Money Market also was a little stiffer than some had been expecting, and rates held rather firm almost up to the close. Business in the Gas Market was pretty fair, considering the general quiet; and on one or two days it was almost up to a moderate average. But the big issue had the lion's share. The tendency was favourable, though few actual advances were noted. In Gaslight and Coke, the ordinary was extremely active and in good demand, and prices quite ran away from the brief set-back of the previous week. The opening figure was 99¼; but before the day was over 100¼ had been reached, and later on business was marked more than once at 100⅜. The secured issues were quiet. The maximum was done at 91½, and a small amount free at 91¼; the quotation being a point lower. The preference changed hands at from 109½ to 111; and the debenture at 88 and 88½. South Metropolitan was steady and quiet, and prices of bargains ranged from 131 to 131¾. The only transaction in Commercials was one in the 4 per cent. at 118¼. In the Suburban and Provincial group, British advanced a point, but was not dealt in. Brentford new marked 192, and ditto preference 131. The Continental Companies were very quiet. Imperial changed hands at from 211½ to 212½; and European fully paid at 22½ *ex div.* Among the undertakings of the remoter world, Buenos Ayres was done at 11⅛ and 12⅛, Monte Video at 11⅝ and 11¾. River Plate at from 12⅜ to 13¼, and ditto debenture at 96. Primitiva preference rose fractionally, and marked 5 7/16. Cape Town was done at 17⅜, and South African at 16½.

The closing prices are shown in our Stock and Share List on page 401.

NOTES FROM WESTMINSTER.

Parliament, it is expected, will be prorogued next Thursday. So runs the latest information that can be obtained before this issue goes to Press, earlier than customary on account of the Bank Holiday. By the time this statement comes before readers, the date will be definitely known.

During last week, greatest interest was centred on questions affecting labour, and that is a topic that concerns all employers, among whom are found the largest ratepayers. In distressful times, gas-works employers have the satisfaction of knowing that it is then they are giving employment to the greatest number of men, but nevertheless the general question touches them at many points. Before last week, it was expected that there was no chance of the Unemployed Workmen Bill going through this session; but, being a Bill that has not universal sympathy, that fact did not create any great outcry, excepting in certain sections of the community, and in the House, where it was made for a time the pretext for obstruction. However, whatever one's views may be in regard to it no one can have serious objection to the trial of the scheme for which it provides for a limited period, to obtain an opportunity for judging of its effect in actual operation. Opposition, too, has been disarmed by two important conditions. The first is the proposed appointment of a Royal Commission to inquire into the working of the Poor Law, and the second are the amendments to the Bill which the President of the Local Government Board has been instrumental in introducing. We need not direct attention to the provisions of the Bill, nor to the amendments; seeing that they have received such general publicity. But it is a satisfaction to Londoners to know that the Metropolis is to be defended from what the Bill threatened as originally framed—that was, the conversion of London into a sort of dumping-ground for those in search of relief and employment. London has a sufficiency and to spare of its own extremely poor. Applicants for employment under the Act (if it gets through) will, so far as London is concerned, need to have been resident within its area for at least twelve months. The financial provisions remain practically the same; but proposals have been removed which had the objection of permanency about them. The Act is to continue in force for three years, and no longer, unless otherwise determined by Parliament; and by that time the Royal Commission will have completed their labours, and will also be in a position to report upon the operation of the Act. It is a large subject, and involves many problems. Seventy or more years have passed since the last inquiry into the working of the Poor Law; and industrial and social conditions have since undergone vast changes. The Royal Commission will therefore have plenty to occupy them within the period that the Unemployed Workmen Act will be in force. The Bill, by the way, was ordered for third reading on Friday night.

One other matter. A Bill was introduced by Mr. Balfour on Monday last week, which is to make the Board of Trade and the Local Government Board offices of a Secretary of State; and it provides for the raising of the stipend of the official chief of the Board of Trade by £3000 a year (making it £5000), and that of the chief of the Local Government Board by £1000 (making it £3000). A transfer of duties among the various Government departments is to take place on an extensive scale.

The London Electricity Power Bill.

As day by day passed last week in the Committee room in which Sir James Kitson and his colleagues sat, the situation for the time got unmistakably clearer for the promoters—not that they were able to bring anything more than all the old hypotheses to bear upon their case, but because day by day the London Companies and some of the authorities succumbed to the blandishments and promises of the promoters, and entered into agreements with them which, if the Bill becomes law, will be of benefit to the Administrative Company and of very doubtful advantage to anyone else. Figures as reliable as those produced by the promoters that were laid before the Committee early in the week went to show this. Proud, however, were the promoters when they opened a map in the middle of the week showing the extensive portion of the area within which they then stood unopposed by the occupant electricity suppliers. A large proportion of both companies and authorities had by that time lent their assistance to the promoters realizing what is undoubtedly their aim—of eventually being the producers of the greater part of the electricity supplied in London and a distance beyond; but if realized it will be attended by enormous risks. When the Bill was first introduced, it was argued that it was solely in the interests of London and its industries; but the agreements that have been entered into completely spoil the argument. In all those districts where agreements now obtain, the consumer will, when (if ever) they have effect, be called upon to pay dual profits; and all point as to advantage that was to accrue to consumers from competition from power supply also falls to the ground. If ever there was any chance of the general public deriving any benefit from the measure, the events of the week made it more shadowy than ever. At no time could anyone with intelligence see how the small power consumer (who would not get his modest supply at the fraction of a penny mentioned by the promoters) would be a gainer. The large power consumer and the Administrative Company themselves might profit; but no one else. The authorities and companies who buy in bulk would have to purvey at very similar prices to those now existing, so that, if there was any advantage at all it would be only the few who would realize it, and the majority would be adversely affected by the division of the custom.

We cannot understand why the renegade companies and authorities did not wait until they saw whether or not the Bill got through, instead of making bargains with a Company without existence and authority, and doing the very thing that would have greatest influence in bringing about the passing of the measure. The companies and authorities by their action virtually admitted that the evidence they have been placing before Parliament was untrue; for one of their strongest points has been that their present position shows that, by the time the Administrative Company can get to work, they themselves will be able and willing to supply energy for power at equal prices. There is something incomprehensible about the whole thing. The original plausible appearance of the scheme also faded considerably by what transpired; and its true intent was gradually made plainer. The London County Council and the stronger of the Borough Councils carried on the opposition during the week. The purchase clause submitted by the promoters was forcibly attacked, particularly on the ground that, unless some proper safeguard was inserted for only effective capital expenditure being the basis of the purchase price, the clause would be an incentive to waste and extravagance, and would prevent purchase on fair terms. It was clear that there was great anxiety on the part of the promoters for the safety of the measure, in view of the few days of the session remaining; and the Committee kindly acceded to the request of the Hon. J. D. Fitzgerald, K.C., the leader for the promoters, that the sittings should be protracted, in order to get through by Friday. In consequence of this, the Committee continued Thursday's sitting until the unusual hour of six.

But it was no good. Friday saw Mr. Fitzgerald replying for the promoters; and, in the course of his speech, he offered to vary the terms of the purchase clause (retaining the fifty years) to comply with the terms of the Act of 1888, provided that the Company were not prevented from setting aside a sinking fund. This concession affected the very point of the purchase clause on which the strongest attack had been made; and therefore the tactics of the promoters were decidedly at fault in keeping the amendment back until almost the last minute. Then came for them a terrible blow. The Chairman said the amended clause would have to be put before them, as its terms would have a strong influence on the minds of the Committee; and he asked the promoters to bring it up on Monday morning. Upon this there was great consternation among the promoters. Mr. Fitzgerald offered to read the clause at once, and implored the Committee not to adjourn without giving their decision on the preamble. The Committee, who thought they had been very lenient and that the opposition had not unduly prolonged the proceedings, were obdurate. They were bound to have time for consideration; and so the matter had to stand over till yesterday. It cannot be said at the time of writing whether this will contribute to the destruction of the Bill; but the Agents on Friday regarded the prospects as very gloomy.

Bolton and the Water Profits.

Some of the changes that were made in Committee on the Bolton Corporation Bill were mentioned in the "Notes" a fortnight since; but there is one that was not referred to which will have the effect of ensuring that the water profits in future will be devoted to the purposes of the undertaking through the accumulation of a reserve fund. The Corporation themselves put in the clause as to the reserve fund, and the only point for the Duke of Northumberland's Committee was as to the annual amount to be contributed. There can be no dispute as to the value of a substantial reserve fund in all corporation undertakings, to meet deficiencies in the annual income and any extraordinary charges which may fall upon them. In the case of the Bolton Water Department, they have an annual surplus; and the view is that this will continue until the Committee have to meet the charges on the new works for which the Bill provides, and then the surplus will disappear in interest. The Corporation therefore asked that during the first five years they should carry £10,000 annually to the reserve fund, and £5000 a year afterwards. The Committee accepted the clause, subject to the reduction of the £10,000 to £8000. The profits will now, therefore, be diverted from the borough fund, and be applied solely to the undertaking.

ELECTRIC LIGHTING MEMORANDA.

Economic Hints and Practices—The Successes of Gas Lighting in London Streets—The Grief of the City of London Company—Repairing the Waterloo Bridge Folly—Cooking and Heating by Electricity—The Osmium Lamp.

It would seem from the occasional peeps one gets behind the scenes, that in electrical circles there has been a not insignificant amount of cryptic discussion over the hard blow dealt by the Corporation of the City when they determined to uproot several electric arc lamps in the streets, and put in their stead high-pressure and ordinary incandescent gas-lamps. The electricians do not like the look of things; and so they are inquiring among themselves what they can do to stem the course of events. After putting their learned heads together, they find the best way to obtain greater economy is by spacing out the lamps to greater distances, by shortening the hours of lighting, or by creating a loss on the public lighting, and making someone else pay. Prodigious! It is all a matter of price; and electricity has not yet succeeded in doing the work as economically nor as well as incandescent gas-lamps properly applied. The initial expense of putting up the gorgeous and gigantic columns that electricians regard as necessary for arc lamps and the working costs are both heavy; and there seems to be no way out of the difficulty, but those referred to above, which have been evolved after most profound consideration. Anyone who happens to be in Brighton, and who concerns himself with public lighting, might do worse than walk at night time from one end of the Parade from the Palace Pier to the end of the lawns at Hove, to get a lesson in how not and how to do things. Huge electric arc-lamp standards, with three or four arms embracing the lamps at the top and throwing ugly shadows across the roadway and the parade, and indifferently lighting them, are found in Brighton. At the Hove end, the parades and lawns are well and picturesquely lighted by incandescent gas-lamps. Anyone standing on the West Pier has a fine opportunity of getting an impression of the attractiveness of the lighting of the Hove part of the front as compared with that of Brighton. But that is not all. Recent experience was that the incandescent gas-lamps at Hove were lighted, night after night, before the Brighton electric arcs. Darkness had well set in before the arc lamps commenced duty; and had it not been for the lights from the shops and piers, there would nightly have been danger of serious personal collisions with animate or inanimate objects along the parade. We will suppose that in Brighton they have still 372 arc lamps, and rather more than four times as many incandescent electric lamps, a saving of a quarter of an hour or twenty minutes nightly spread over this number of voracious lamps must mean a considerable economy in current; but it does not enhance the attractions of financially over-burdened Brighton. We wonder whether economy is the object of this late lighting. If it is not, it effects it. And a good many units are saved while the public are wandering along the darkened parades.

But in the matter of public lighting, London is still showing its dissatisfaction with electricity by—excepting in very occasional instances—an increasing patronage of incandescent gas lighting. The "Journal" has shown this again just lately. Only last week, the announcement was made that Parliament Square is to be lighted by incandescent gas-lamps. This means that gas is to be continued, on an improved method of use, as the means of lighting right up to the doors through which our Legislators pass daily during the sittings of the Houses. What the London County Council have resolved to do respecting Waterloo Bridge is referred to in a succeeding paragraph. In last week's issue, mention was also made of the passing of an order to the James Keith and Blackman Company for the high-pressure gas lighting of

Lower Thames Street and Monument Street. But this is, as a matter of fact, part of the scheme which was agreed upon in May last. Over what is happening in the City, the City of London Electric Lighting Company (who a few days ago were among those Companies who dropped their independence and chained themselves to the Administrative Company) are copiously shedding tears, as was seen by the letter published on p. 333 last week. They ask for pity of the Corporation, point to the large capital expenditure involved in the street lighting of the City, confess that there have been left undone many things which might have been done in improving the lighting of City streets, and urge that the supply of electricity for public lighting has been given at a "very low rate," but they have derived no corresponding advantages. If electricity has been supplied at a "very low rate," and the Corporation can see their way to effect an economy of £375 by replacing 47 arc lamps by high-pressure and ordinary incandescent gas-lamps (and, at that rate, something like £4000 a year if the whole of the arc lamps were similarly treated), then the greater the feather in the cap of the Gas Company. The City Corporation cannot allow sentiment or auld acquaintance to stand in the way of looking after the interests of the ratepayers; and contracts, with or without flaws in them, cannot be perpetually binding unless so defined. The Company have prayed for a conference, with the view of getting the street lighting settled "satisfactorily" to both parties. But there are three parties—the third being the ratepayers; and the only satisfactory settlement for them is that which gives the best value at a reasonable price. The Electricity Company's letter has been referred to the Streets Committee. The Streets Committee have had a long experience; and it may be predicted that the Company will get little commiseration from that quarter. While on this public lighting question, we do not recollect having mentioned in this column that the Auditor of the Islington borough accounts recently observed that he notices, "from a report of the Finance Committee, that sometimes in Islington, where arc lamps take the place of incandescent gas lamps, the annual cost to the rates is increased by ten to one."

At length the London County Council have resolved to acquit themselves of the abominable piece of folly which they perpetrated some years ago in removing the fine bronze lamp standards from Waterloo Bridge, and erecting in their place electric light standards of particularly feeble design, and altogether out of character with the noble bridge itself. The Council brought upon themselves some caustic criticism when they so determined; and they have moved tardily in undoing their foolishness. It was away in June of last year that the Bridges Committee were instructed to report on the subject; and they have since taken counsel with two "R.A.'s"—in fact, persons of no less distinction than Mr. George Frampton and Sir William Richmond. The upshot of the matter is that the bronze columns are to be reinstated; and what is also of consequence, they are to carry at their heads two incandescent gas-burners, and not electric arcs. The cost of attaining the *status quo ante* is estimated at £650. But of special interest is the statement of this Committee of a Council who have done so much to foster electricity supply in London, that the change will be "considerably more economical" as the cost of maintenance will be largely reduced. At present half the lamps on the bridge are lighted by the Charing Cross Company in consideration of the wayleave granted them; and the remainder of the lamps are supplied with current from the Council's own generating-station, at an annual estimated cost of £230. And "this does not take into account the cost of supply of the current from the Council's generating-station, which, as regards actual work and material, amounts to about £100 a year." With incandescent gas-burners, the cost of maintenance will be about £95; while the Electric Company will be prepared to pay as wayleave a rent of £65 a year—thus reducing the annual cost to £30 a year. The investment of the £650 in putting right the barbarous piece of work of a few years ago is going to produce a handsome return.

The Islington Borough Council have been effecting certain changes in their charges for electricity; and among the resolutions they have passed is one making the price 1d. per unit for power, heating, and cooking. This has been going the round of the papers, accompanied in one or two cases by editorial remarks as to the cleanliness and so forth of cooking and heating by electricity. This cooking and heating by electricity is getting rather a stale joke now; and the business done must fall considerably short of the money spent in trying to gull people into spending their money foolishly. We have the authority of Mr. J. C. Wigham, a Director of Edmundson's and the Urban Electric Supply Company, for using the word "foolishly." He was a speaker at the opening of an electrical exhibition at Godalming the other day; and he then assured those present that electrical heating apparatus had not been sufficiently perfected, and that the price was too high to make it worth while using electricity for cooking generally. But for smaller operations, it might come into use. Mr. Wigham bears out the experience of those who have been talked into making experiments. While there is no connection, beyond that of occurring in the same speech, Mr. Wigham also called attention to a group of five Welsbach osmium lamps on view. He mentioned that there was a difficulty in their employment on the circuit in Godalming, because they had to use the five in a group; and until some means were invented of allowing them to be used singly, they would not be of much use there.

THE OPTICAL AND HYGIENIC VALUE OF VARIOUS ILLUMINANTS.

THE Congress of the Royal Institute of Public Health, recently concluded, gave occasion for a few incidental references to the advantages of lighting by gas.

In a paper, upon "The Planning of Educational Buildings," Mr. E. R. Robson, formerly adviser to the Board of Education, and Mr. P. A. Robson expressed a preference for lighting by acetylene. The authors' words are as follows: "The best form of artificial lighting is by acetylene gas, generated by an apparatus in which the calcium carbide drops into water, and then the gas should pass through a purifier." Presumably, this view is not set forth without full consideration being accorded to other methods of lighting—especially incandescent gas and electricity; but it is given without assigning any reasons why acetylene should receive premier recognition. What considerations or what actual experiences have led to such a conclusion, we are not informed; and we are in ignorance as to what advantage could be adduced in favour of acetylene, as an offset to its admitted lack of diffusive power, and its high cost of production. Probably, the diminished consumption of the oxygen of the air is the factor that has weighed with Messrs. Robson; but if this be so, it may surely be regarded as more than counterbalanced by the greater aid to ventilation which incandesent gas lighting affords. Not only in this regard, but in its more equable diffusion of the light, and consequent preservation of eyesight, may incandescent gas claim a pre-eminence above its rivals—acetylene and electricity included.

Dr. Allan Wilson, in effect, stated as much when he informed the congress that the electric light did a large amount of harm to the eyes of persons exposed to it. Fearful lest this adverse opinion of electric lighting should create unnecessary alarm in the public mind, Mr. James Aitchison, the eminent optician, writes to the daily press, saying: "It has been to some extent admitted that the ultra-violet or chemical rays of the electric arc and naked filament lamps are irritating; but the same is said of the incandescent gas mantle. The ordinary incandescent (electric bulb-lamp) is practically harmless when it is protected by frosted glass. The cases where defective eyesight is attributed to such light are invariably explainable on other grounds—chiefly, that in big towns ventilation and daylight exist in inverse proportion to the use of such lamps. It is the absence of healthy surroundings that is the real factor. Hygienically, the superiority of electric incandescent lamps as illuminants, to any combustion lamps, which must needs deteriorate the air, is overwhelming."

From this letter, it would certainly appear that Mr. Aitchison's strong objections to gas-lighting are based not on optical considerations but on hygienic ones connected with the process of combustion. Coming from an optician, we should naturally expect that a comparison of electric and gas lighting would be made from the standpoint of eye-preservation rather than from that of the initial and final state of the atmosphere as affected by the products of combustion. Nothing that appears in Mr. Aitchison's letter can be said to invalidate the charge brought by Dr. Allan Wilson against the electric light. On the contrary, his admissions are quite noteworthy; and the only conclusion that can be drawn from the accusation and from the defence alike, is that the electric light when unshielded in a thorough manner, is injurious to human sight. In other words, there must be effective obscuration of arc and glow lamps, if the eyesight is to be preserved. Mr. Aitchison implies (although he does not clearly state) that the products of consumption of gas have upon the organism of the eye a deleterious effect; and he proceeds to array what must at the most be a minute effect in opposition, and as equivalent to a well-known and much greater one. For the effect upon the eye of the slight change in the atmosphere, must surely be much smaller than the incidence of the admittedly injurious rays or of undiffused light.

That injury to health is caused by lack of ventilation, we have no doubt; but that this is necessarily and seriously augmented by the use of incandescent gas lights, we do not believe. The proper application of this system may secure an ample light, without any distressing effects on the eyes, even when engaged in the most exacting work; and it may be accompanied by the simultaneous removal by ventilation of the products of human exhalation, while at the same time the supply of air for combustion, and the products of combustion, may if necessary be kept quite independent of the air in the apartment so lighted. This ideal of health and comfort can be fully realized in the most economical manner by an intelligent use of the known means of incandescent gas lighting.

On Monday last week, the Prime Minister introduced a Bill "to make the Board of Trade and the Local Government Board offices of a Secretary of State." The first of the operative clauses runs as follows: "All powers and duties of the Board of Trade and of the Local Government Board shall become powers and duties of a Secretary of State, and all enactments, rules, orders, minutes, deeds, and other documents, shall be construed accordingly." The new Secretaries of State so appointed are to be deemed the successors of the two Boards named.

LESSONS IN GAS SUPPLY FROM SWITZERLAND.

English gas engineers, in common with their German colleagues for whose benefit it was primarily prepared, may gain some useful hints from the paper by Herr Zollikofer, of St. Gall, of which a summary appears on another page to-day. The peculiar situation of this little Swiss town, in a long and narrow valley with lofty hills on either side, on the faces of which are outlying habitations, called for special consideration of the problem of gas supply. The old works in the town had ceased to be adequate to meet the rapidly growing demand for gas, and their extension, owing to the narrowness of the valley and the varying levels of the district, would have proved a somewhat thankless task. Herr Zollikofer, the Gas Engineer, had long made a special study of distribution at high pressure; and when the occasion arose for re-modelling the St. Gall gas supply, he proceeded to evolve the scheme, for the establishment of new gas-works over six miles from the town, of which his paper gives the more essential details.

The works are equipped with benches of inclined retorts, nearly 20 feet in length and therefore a departure, admittedly based on English experience, from Continental practice, which hitherto has favoured short inclined retorts. The considerations which led Herr Zollikofer to adopt the longer retorts are set forth by him with great lucidity, and, after over a year's working, he is apparently well satisfied as to the wisdom of his choice. The gas leaves the works for the gasholders in the town by a main nearly 14 inches in diameter, and pumping plant is provided which will force nearly 2000 cubic feet of gas per minute into this main at a pressure of 17 inches. It is ultimately intended, however, to work up to a pressure of 72 inches, so that the one feeding main should suffice to meet the demands of St. Gall at the normal rate of increase for more than thirty years to come. An interesting point in connection with this high-pressure main is that the gas is washed with oil at the works in order that it may be freed from naphthalene, which otherwise would be likely to block the main where it crosses a ravine and railway cutting, and is consequently unusually exposed. It has already been found that the main, at the relatively low fall of pressure of 7 inches, discharges nearly 10 per cent. more gas than the common formula for the flow of gas in pipes admits; and further results for the discharge at higher pressures, which are promised shortly by the author and an academical colleague, should prove very interesting reading.

Herr Zollikofer has attacked a rather difficult problem in gas supply with characteristic Swiss energy and initiative; and we hope that when the scheme has been more fully tested, he will again give the gas industry at large the opportunity of profiting by his experiences. We have no hesitation in pronouncing his paper the best of the communications dealing with gas supply presented at the recent meeting of the German Association at Coblenz.

PROGRESS IN GAS PURIFICATION.

Among the many topics introduced into the Presidential Address of Mr. J. W. Carmichael before the North British Association of Gas Managers (*ante*, p. 240) was that of the present practice and future prospects of gas purification.

Knowing the keen insight which the Scotsman invariably brings to all commercial problems, we must confess to being puzzled by the lack of clearness in his remarks upon this particular subject. He does not see that much harm is done, so far as the illuminating power of the gas is concerned, by retaining carbonic acid—especially in these days when the cry is for cheap fuel gas. If, however, a definite illuminating power must be supplied, it becomes a question—under the particular circumstances—whether it is more economical to do so with the carbonic acid retained or removed. Certain it is that where enrichment is required (either by spirit, oil gas, or other costly material) it is cheaper to remove the carbonic acid than to use a greater quantity of the enriching material. The only class of operations, therefore, where it may be a question for further inquiry is where the requirements for illuminating power can be met even when the carbonic acid is retained and no enriching material employed. The question then assumes a new form—Will it pay better to increase the temperature of distillation, thereby producing a larger volume of gas per ton of coal with a consequent fall in illuminating power, and remove the carbonic acid in the purifiers so as to restore the original quality? What will be the verdict in such a case, can only be known when all the conditions are definitely stated—especially now that spent lime has become such a drug as the President recognizes. But it is in such a strait, that the advantages of purification by ammoniacal liquor ought to be of greatest assistance. Indeed, it would be strange if it were otherwise; for, as it is freely admitted that the partial removal of carbonic acid and sulphuretted hydrogen by ammoniacal liquor is satisfactory and economical, why should it be regarded as undesirable to remove the greater part or the whole by analogous means? Mr. Carmichael is, indeed, hopeful that purification in closed vessels may ultimately be adopted, although up to the present he thinks it has not proved a success.

If by the last-named statement of failure is meant that gas cannot yet be freed from all its sulphur compounds and carbonic acid by ammoniacal liquor, then it may be admitted that there is some force in the assertion. But, on the other hand, Mr. Carmichael appears not to take the sulphur compound into his purview. To the smaller problem of removing the bulk of the sulphuretted hydrogen and carbonic acid by means of ammoniacal liquor, the remarks are much less applicable; and the method is capable of giving many of the advantages of lime purification at a merely fractional cost. For some years, these advantages have been realized by the South Metropolitan Gas Company at their Old Kent Road works; and according to the evidence adduced before the Board of Trade Departmental Committee by the officials of the Company, the application is likely to be extended to the other works of the Company. Other gas-works may be mentioned in this connection. But it cannot be expected that success will come in this matter until many more gas undertakings take their share in tracing the line of progress. As soon as the responsible heads of gas-works realize that the purification of gas in closed vessels will come directly they are alive to its possibilities, so soon shall we hear no more of the fears and doubts that have hindered its general adoption for at least a quarter-of-a-century.

The removal of carbonic acid and sulphuretted hydrogen is, of course, quite well understood; but where sulphur compounds are to be taken out, the matter is not so simple. Their removal by ammonium polysulphides under certain conditions is a possibility that has been shown to exist; but the determination of the conditions which give reliability need to be ascertained, and there is a probability that these may be co-incident with the profitable removal of the cyanogen compounds from the crude gas. We cannot believe that either the simple or the more complex question will be allowed to lie dormant; but while hoping, with the North British President, that purification in closed vessels will be the method of the future, we hope also that the future will not be unduly distant.

GAS SUPPLY ON THE CONTINENT.

The visit of the British Committee for the study of Foreign municipal institutions was concluded on the 29th of June last; and we are now able to deal with their report in so far as gas matters are referred to. The outstanding feature in this regard is the apparently complete triumph of incandescent gas lighting for the public streets. So fully is this the case, that the subject appears to be regarded as beyond controversy; and the following sentences summarize the Committee's opinion. "As is the case in most of the cities visited, both gas and electricity were used conjointly. In the matter of gas, the incandescent system was the invariable rule; and it goes without saying that German gas lighting is of the finest description." From incidental references in the report, we gather that the proportion of electric street lighting is insignificant and is not a growing quantity; while the output of gas in the cities visited was everywhere progressing at a very satisfactory rate. The gas-works were considered from the standpoint of the various municipal authorities whom the Committee consulted, which explains many of the references to the relative success of company and corporation control of gas undertakings. The following are summaries of the report as to gas supply in the several cities visited.

Brussels.—The works are of a very extensive character. Inclined retorts are employed, the coke from them being drawn on to a revolving band, passed along a trough, and at the end of the shed quenched with water. The method of cooling the coke does not depreciate its value, and it realizes 20 to 25 frs. per ton. The bye-products manufactured are sold for 150,000 frs. per annum. The Company pay 10 per cent. dividend; the profits amounting to 2½ million francs per year.

Aachen.—By the agreement with the Imperial Continental Gas Association in 1888, the town has the power to take over, at their estimated value, the undertaking on condition of giving notice to that effect at the latest four years before the expiration of the contract on June 30, 1912. The Company have supplied since 1838; and, while the present contract abides, the town waives the right to erect other gas-works. In the event of their not exercising their purchasing powers, the contract will be renewed for a period of fifteen years. The public lighting is taken over by the Gas Company, who pay to the town 2 pf. per cubic metre for gas for lighting and 1 pf. for heating, cooking, and motors.

Cologne.—The two works built by the Imperial Continental Gas Association were taken over by the Corporation, who, in 1876, built the present works. They were for a daily production of 120,000 cubic metres, which was reached in 1897; but additional plant has brought the output to 150,000 cubic metres. By the incorporation of the suburbs, the Corporation came into possession of several smaller works; but the operating of these has been suspended. In 1900, the maximum day's consumption was over 162,000 cubic metres, and an extension of plant on a large scale became necessary. This is to consist of a water-gas plant with a daily production of 96,000 cubic metres, and other coal-gas works to produce 154,000 cubic metres; so that when the works are completed the capacity of production will be 400,000 cubic metres daily. The cost is estimated at 13,000,000 marks. The water-gas plant to produce 48,000 cubic metres, on Professor

Financial Statement of the Berlin Municipal Gas-Works (in Marks).

Fiscal Year.	Value of Undertaking at end of Year.	Actual Amount of Loan.	Year's Receipts.	Expenditure.				Balance of Income.
				Interest on Loan.	For Redemption of Debts.	Other, Especially Working Expenses.	Total Expenditure.	
1899 . . .	78,399,665	24,081,894	23,938,820	874,222	1,004,195	16,373,623	18,252,040	5,686,779
1900 . . .	80,897,597	24,562,813	27,263,144	891,664	1,047,242	18,862,102	20,801,009	6,462,734
1901 . . .	83,449,956	27,015,360	26,130,426	936,524	1,092,158	21,092,376	23,121,053	3,009,372
1902 . . .	92,788,615	33,794,454	27,216,898	1,341,329	1,439,632	21,736,968	24,517,929	2,698,968
1903 . . .	103,210,090	42,486,946	29,772,673	1,789,304	1,284,364	21,815,980	24,899,648	4,873,025

Strache's system, has started working, and the coal-gas works, begun in 1903, will be operated next year. In these extensions, wherever possible, mechanical means have been installed, and in other respects the work made so simple as to be done by unskilled workmen. The surpluses handed over to the municipal exchequer by the gas-works and the electricity works were as under. The profits from gas, water, and electricity last year amounted to 1,500,000 marks (£75,000); 1,000,000 marks going to pay off the Company from whom the gas-works were taken over.

Financial Statement of the Cologne Municipal Gas-Works and Electric Works (in Marks).

Financial Year.	Gas-Works Profits.	Electricity Works Profits.
1894	827,272	—
1895	815,764	81,794
1896	879,664	124,346
1897	1,097,951	167,004
1898	1,135,647	204,004
1899	1,230,584	211,092
1900	1,557,864	183,895
1901	1,187,106	168,816
1902	1,097,317	292,418
1903	1,427,930	310,215

Berlin.—The concession granted in 1826 to the Imperial Continental Gas Association, and its subsequent modifications caused by municipal competition, are reviewed by the Committee. After the establishment of the first municipal gas-works, there was a rapid increase in gas consumption, which compelled the Corporation to erect three additional works. The maximum yield of these works is 1 million cubic metres per diem; and at present a new works is being constructed at Tegel to produce 780,000 cubic metres; while a plot of ground has been purchased on the Upper Spree for a works to produce a similar daily quantity as those at Tegel. On March 31, 1904, the ordinary meters numbered 164,082; the automatics, 16,939; and the public lamps (all incandescent), 29,829, supplied from the Municipal gas-works. The total amount of gas delivered in Berlin in 1903 was 240,363,000 cubic metres, of which 191,772,000 cubic metres were from the Municipal works, and 48,591,000 cubic metres from the Imperial Continental works. The price fixed in 1901 is the same by the Municipality and the Company—viz., $12\frac{1}{3}$ pf. per cubic metre. The economic results, as shown in the table at the top of the page, may be termed entirely satisfactory.

Dresden.—The original works have been removed, and the city now possesses two large gas-works, one on either side of the river. The mains have a length of 330 miles; and the annual consumption of gas 1154 million cubic feet. Consumers' meters number 34,000, for upwards of 333,000 lights. The public lamps are 12,000 for gas and 680 for petroleum. There are 700 gas-engines, 1500 gas-stoves, and 3600 other installations for technical uses, including cooking and heating. The gas used for these purposes, as well as for the lighting of halls and staircases of tenements, is charged at 3s. $4\frac{1}{2}$d. per 1000 cubic feet; the price for ordinary lighting is 4s. 6d. The net profit for the year 1903, after deductions for depreciation, renewals, and reserve, amounted to £107,000.

THE NEW GASHOLDER AT AMSTERDAM.

By J. van Rossum du Chattel.

The article in the "Journal" for the 11th of July, entitled "A Departure in Gasholder Construction," induces me to offer some observations which I regret I have not been able to make before.

It is evident, from the sentence "It is not, however, easy to understand why such an expensive design should have been adopted for the inner wall of this tank, which is formed of a series of heavy staunchions with buckle plates between, instead of Intze's circular dome, or even of that which is most usual—namely, continuous plating," that you are not very familiar with this kind of "mid-air" construction, as you call it. An Intze's circular dome is, as I have found from calculation and have been told by tenderers, certainly much more expensive; and continuous plating of steel or homogeneous iron must be considered as totally out of the question. Indeed, it is pretty certain that under our conditions no cheaper construction is possible; and even well-known English gasholder-building firms have had to recognize this fact.

It may, perhaps, be interesting, as being of more recent date than the Western holder, to give you the following list of tenders, for the latest gasholder of 60,000 cubic metres, equal to about $2\frac{1}{8}$ million cubic feet, which we are erecting at the Eastern Gas-Works, and which will be completed this year.

	Holder. Florins.	Foundation with Ring Wall. Florins.
Hiernaux Laviolette, Jumet . .	392,210 ..	116,140
Bonnet, Spazin, et Cie., Lyons .	380,000 ..	86,000
S. Cutler and Sons, London . .	309,900 ..	99,600
C. & W. Walker, Donnington . .	279,744 ..	86,424
Berlin Anhaltische Maschinenbau Actien Gesellschaft, Berlin . .	276,068 to 265,897 ..	76,500 to 56,088
A. Wilke, Braunschweig . . .	286,000 ..	59,830
Kölnische Maschinenbau Actien Gesellschaft, Cologne . . .	326,678	(total with foundation)
F. A. Neuman, Eschweiler . .	279,100 ..	42,200 to 49,200
	210,500 ..	70,900 to 73,000
	199,850 ..	58,000
Aug. Klönne, Dortmund . . .	210,000 to 214,500 ..	50,000 to 58,250

The lowest offer—that of Neuman—could not be considered, as it was not a "mid-air" holder as prescribed; but it shows that the difference between it and the next tender was of little significance. When you study this list, and take into account that the indifferent nature of the subsoil makes a very costly foundation always necessary, which over the whole surface would, of course, be much more expensive than a ring only, you see that the holder of Herr Klönne, without foundation, as chosen by us, will cost 214,500 florins.

In the same number of the "Journal," it is stated, in the account of the visit of the Belgian Association of Gas Engineers to the Liége Gas-Works: "The holder has three lifts, and a capacity of about $1\frac{3}{4}$ million cubic feet. The total cost was stated to be at the rate of 7·6 frs. per cubic metre, or a little more than £8 10s. per 1000 cubic feet—surely a very low figure, and one which English engineers will find it difficult to improve upon." As at Liége no foundation whatever was necessary, the subsoil being of a very different nature from that at Amsterdam, you will see that the cost of our holder, inclusive of everything—painting and all necessary apparatus and piping for heating up the tank and the cup water in winter (including the existing holders)—coming as it does, without foundation, to ± 7·3 frs. per cubic metre, is not so much out of the way.

You do not bear in mind that the question is not only one of land being too valuable, but of land conveniently situated, which may not be procurable at any price; and further, it should not be forgotten that a large store-room is obtained, which, if it had to be built separately, would entail expense equal to the greater part of what the foundation has cost.

The actual weight of homogeneous iron in Herr Klönne's project for the Eastern Gas-Works is 1,412,900 kilogrammes, and is very far below that of the English tenders, as already indicated by the prices. It comes to only £1 5s. 8d. per English ton fixed, inclusive of everything.

I hope on some future occasion to return to this subject, in regard to what you say on the question of tangential rollers for the guiding of the holder. Meanwhile, I can assure you that it is my firm conviction that they are far preferable to the radial system.

A Wood-Stave Pipe-Line.—In connection with the city waterworks and the tank of the Atchison, Topeka, and Santa Fe Railway at Raton, New Mexico, there is a 12-inch wood-stave pipeline about 12,000 yards, or nearly 7 miles, long. The pressure of water is 130 lbs., which is as much as it is considered the line will withstand with safety; and several relief chambers have been constructed to keep the pressure below this. The difference in level between the upper end of the old dam and the lower end near the railway station is 458 feet.

A Gas-Engine Yacht.—The current number of the "Engineer" contains an illustrated description of a gas-engine yacht, built by Messrs. Thornycroft, and furnished with plant on the Capitaine system. Herr Capitaine has fitted up several vessels, and achieved some excellent results in sheltered waters on the Continent; but this is believed to be the first boat constructed to run in the open sea. The gas-producer is of the ordinary cylindrical shape; and the drying and purification of the gas are effected without the use of any solid material in the scrubber. The engine is of the vertical enclosed type, having four cylinders, each $8\frac{1}{4}$ inches diameter and 11-inch stroke; and when running at 300 revolutions a minute it gives about 75-horse power on the brake. The hopper of the producer carries enough anthracite for a 10-hour run at a speed of about 10 to 12 miles an hour. The total floor space occupied by the engine and producer is 12 ft. 6 in. by 9 ft. 4 in., and the height in each case is 6 ft. 8 in.

THE ROYAL ARSENAL (WOOLWICH) GAS-WORKS.

[In connection with the recent visit of the Junior Institution of Engineers to Woolwich Arsenal, the following article on the Arsenal Gas-Works has been prepared from notes kindly supplied by Mr. A. W. Onslow, the Gas Engineer.]

The supply of gas to the Royal Arsenal at Woolwich is by no means a small matter. Gas is used there not only for lighting, but for multifarious purposes connected with the work of the nation that is carried on in this vast and busy establishment; and therefore it is that the Arsenal boasts of its private gas-works —or "factory," as it is officially called—and a consumption of gas that many a gas manager engaged in ordinary public supply might well envy.

The Arsenal Gas-Works were originally built in 1856-7, by Messrs. Hanna, Donald, and Wilson; and it is a matter of historical interest to notice, and fresh testimony to the reputation of the firm, that a 25,000 cubic feet gasholder which was then put up still survives, and to learn from Mr. Onslow that the original purifiers were only removed some three years since. But the gasholder is, and the purifiers were, in respect of their capacity, only poor representatives of the magnitude of the gas operations at the Arsenal half-a-century after they were erected. The boiler,

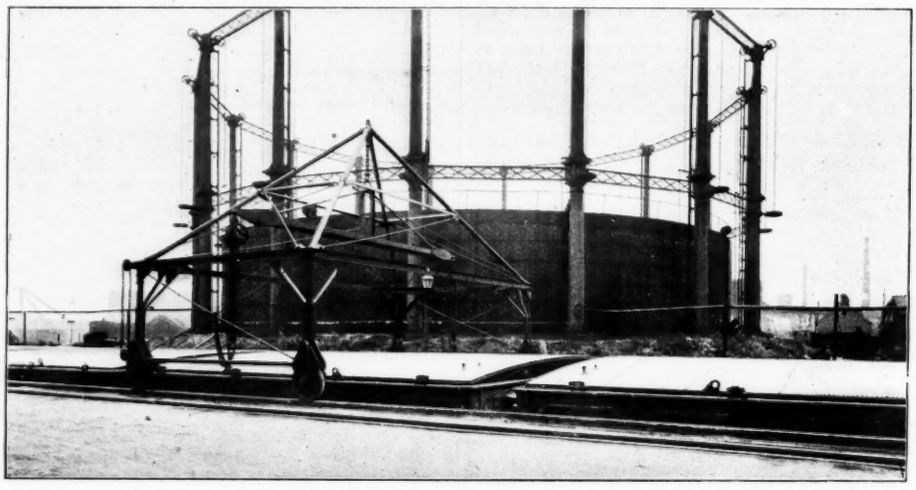


Fig. 1.—Purifier-Crane and Wire-Rope Top Lift Gasholder.

meter, and engine houses are also in course of re-erection, owing to ground subsidence; and the same is the case with the tower scrubbers, which are now being built on piles.

The past of the Arsenal Gas-Works, however, does not contain so much interest as their present. The productive part of the works now consists of two retort-houses, and their equipment is quite of an up-to-date order. In one house is found an inclined bench of 20-feet retorts, with continuous overhead coal-storage hoppers, push-plate conveyors, and bucket elevators. There are also, as if to bring into the closest possible relationship the far-away past with the present, in the same house, two benches of horizontal retorts on the direct-fired system. In the second house, there is only one bench of inclines. However, the total productive capacity of the inclined retorts is 2 million cubic feet per day, and of the horizontal retorts 500,000 cubic feet; so that, as is seen, the gas requirements of the Arsenal are by no means insignificant. The coal is brought to the Arsenal pier by steamships of about 1200 tons burden, are unloaded there by

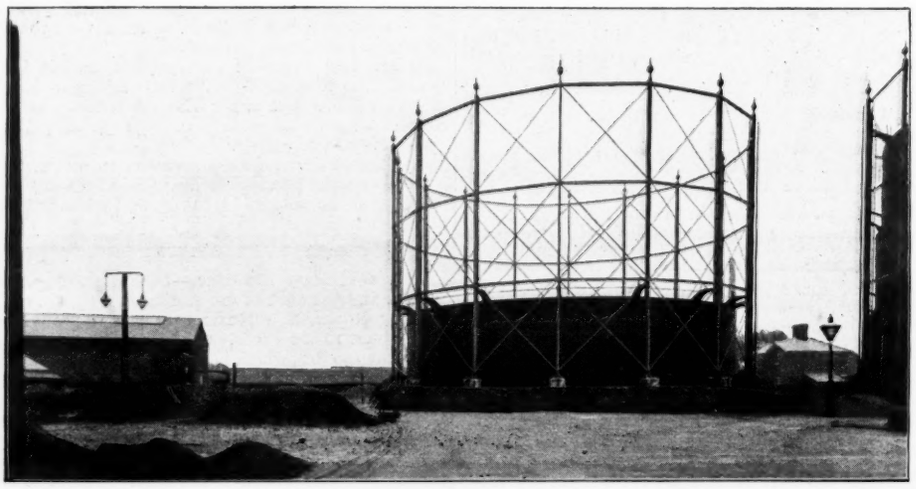


Fig. 2.—One of the Two Holders, altered from Single to Treble Lift, and Tank Enlarged.

grabs and ordinary coal-buckets into coal-trucks, and are then taken by broad-gauge engines to the gas-works about half-a-mile away, where the trucks are delivered into store by hydraulic lifts and overhead railway. The coal is distributed in the overhead hoppers, as already indicated, by means of a bucket elevator and push-plate conveyors, which have a capacity of 30 tons an hour. The whole coal plant is driven (the conveyors for the two houses are at right angles to each other) by a 40-horse power steam-engine; the one engine dealing with all the coal for both retort-houses.

The condensers are of the vertical steel type, and are fitted to the inlet to the exhausters, which, in their turn, are of the four-bladed type, and driven by a vertical engine and a horizontal one. The steam for the works is furnished by two boilers, fitted with Perrett furnaces, under forced draught, and using fine coke breeze. A washer-scrubber of Holmes make, and of 2 million cubic feet capacity, is in use; and in connection with it is found a matter of considerable interest. We have heard, through Mr. Onslow's contributions to our technical societies and in discussions, of the experiences at Woolwich Arsenal with high-pressure

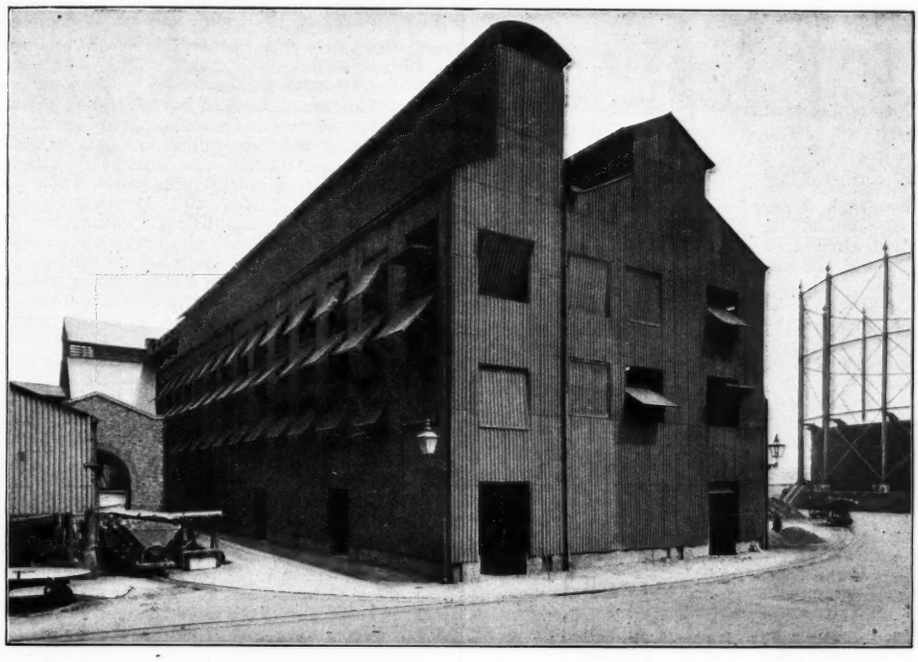


FIG. 3.—THE NEW HOUSE FOR ONE BENCH OF SEVENTY-TWO 20-FEET INCLINED RETORTS.

gas lighting, and of the extraordinary high pressures used there. Geared to this Holmes washer-scrubber is a 100,000-candle power high-pressure apparatus, for lighting the adjacent buildings as well as the gas-works' offices, fitters' and other work shops, retort-houses, engine-rooms, yard, stores, &c.; and well lighted they are too. As to the purifiers, there is nothing special to mention, other than that there are four 18 feet square, and four 26 feet square.

Mr. Onslow has added interest to his notes by supplying some photographs, to which separate attention may be directed.

Fig. 1 shows the crane used for lifting the covers of the 26 feet square purifiers; and it also presents us with a good view of the 750,000 cubic feet holder. This holder has a cast-iron annular tank, and two column-guided lifts. It was constructed by Messrs. Samuel Cutler and Sons. It has, however, since been fitted with a wire-rope guided top lift, put in by Messrs. Ashmore, Benson, Pease, and Co.

Fig. 2 gives a view of one of two gasholders, erected about 45 years ago. These were originally single-lift holders; but the outer plates of the cast-iron annulars were removed about two-and-a-half years ago, and a bottom ring 2 ft. 6 in. wide was put in—the side plates being replaced by making-up pieces. The variation in the circle is not discernible. The original lift of each holder was of a capacity of 100,000 cubic feet. These were then made the inner lifts of three-lift holders—thus increasing the capacity of each to 330,000 cubic feet. The work has proved quite satisfactory, and has fully justified itself as an economical means of augmenting the storage accommodation. The lifts and framing were built by Messrs. Willey and Co.; and the tank and underground work was executed by the War Department, who

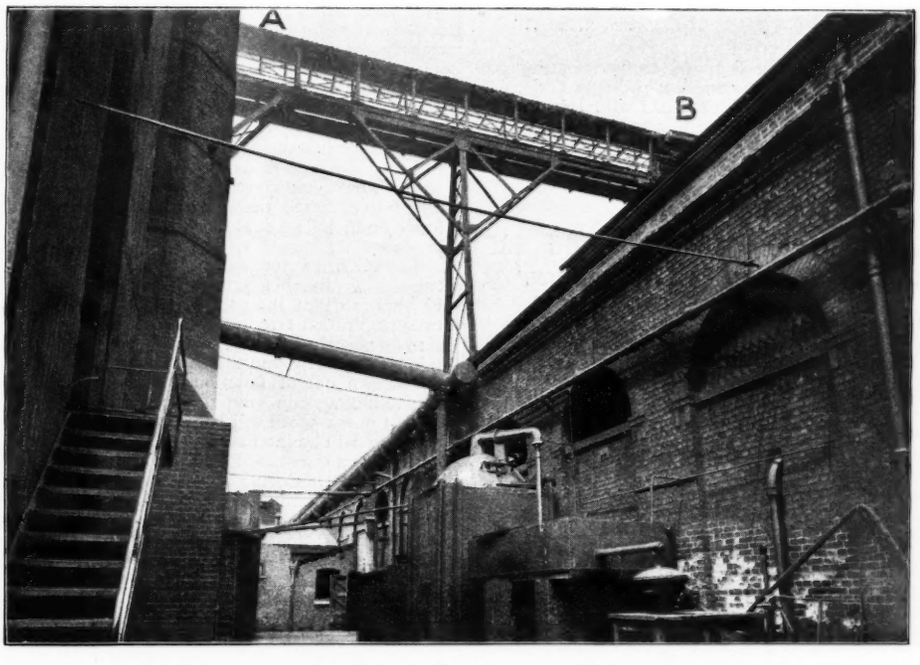


FIG. 4.—VIEW OF THE CONVEYOR FRAMING BETWEEN THE RETORT-HOUSES.

[The cantilever shown in the centre of the photograph was made on the works, and erected in one piece by the gas factory men. The cantilever shown on the left was afterwards fixed, and a platform 3 feet wide was thrown across from A to B. The conveyor framing was taken on rollers over the opening joining a portion of the framing fixed on a third cantilever inside the retort-house. In this work, one lifting pole only was used, and no scaffolding; but unfortunately the difficulties were intensified by a gale of wind blowing at the time of construction. The whole of the work had to be erected in two days. The still at the bottom of the photograph is for making coal-tar varnish.]

found both labour and materials. The emptying of the tanks and their refilling, together with the testing of the holders with air, was also carried out by the Department. During the tank operations, water caused some trouble; but it was overcome by having recourse to a centrifugal pump and pulsometer.

Fig. 3 is a photograph of the new inclined retort-house. It will be noticed that abundance of ventilation is one of the features of the house.

In fig. 4, is a view of the conveyor framing between the retort-houses. This, together with all the supporting framing for the coal elevator tower, &c., was made at the gas-works, and erected by the men. Fig. 5 shows the elevator tower, in erecting which there were considerable difficulties to be overcome. The whole of the work was put together on the ground, as it was impossible, owing to time and other circumstances, to do otherwise. One roof-tie of the coal-store was unfastened; and the roof was stripped to allow the tower to be erected in two pieces —the top portion first, and then the bottom. This work had to be carried out between a Friday night and Monday morning.

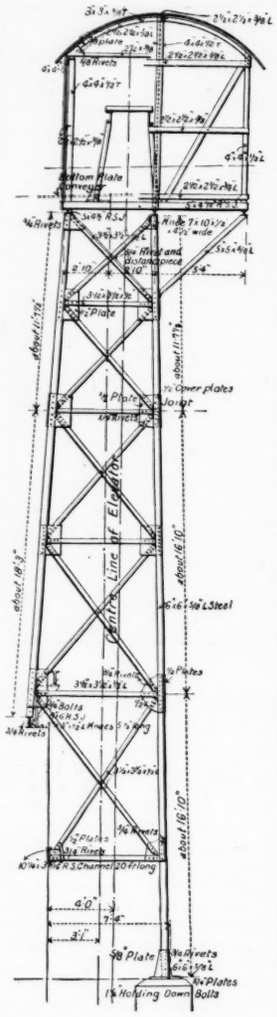


FIG. 5.—FROM THE WORKING DRAWING OF THE COAL-ELEVATOR TOWER.

Reference has been made to the manifold uses to which the gas produced at these works is put. Apart from illumination, quite 50 per cent. of the output is consumed in connection with the extensive and varied work now carried on in the Arsenal. It is employed in such operations as annealing cartridges, tinsmiths' work, lead melting, tempering steel for tools and guns, for shrinking purposes, riveting forges, brazing, chemical, and metallurgical work—in fact, the use of gas enters so largely into the work of manufacture that it is almost impossible to describe its purposes fully in this article. A very interesting application is found in the automatic gas-heated machines for soldering purposes. One result of the use of gas under a pressure of 60 to 80 inches is the gradual discarding of air-blasts with low-pressure gas for heating purposes.

The pressure of the gas for ordinary use is regulated by three governors—one for the Woolwich Garrison (which is lighted by gas from the Arsenal) and two for the Arsenal itself.

THE DOMESTIC USE OF ILLUMINATING GAS:

ITS DANGERS AND THE MEANS OF AVOIDING THEM.

By HENRY LEFFMANN, M.D., of Philadelphia.

[A Paper read before the Philadelphia County Medical Society.]

The employment of illuminating gas manufactured from coal is about a century old. The original method, exclusively in vogue for many years, was by destructive distillation of soft coal. The operation is very simple: The coal is heated strongly in a closed vessel, and the gases produced are cooled, purified, and distributed. The impurities of the crude gas are numerous, but of only few types. Ammonium compounds and sulphur compounds are the most objectionable; and much attention has been given to devising methods for their removal, which in well-operated works is satisfactorily accomplished. The purified gas as conducted into the storage tanks consists principally of hydrogen and hydrocarbons, among the latter being methane, ethene, and benzene. Some carbon monoxide is also present.

Laboratory experiment and clinical experience have shown that gas made in this manner has not very high toxic qualities; the hydrocarbons and hydrogen being rather negative than positive. They are incapable of supporting life, but are not active poisons. The gas always has a characteristic odour that gives warning. During the past quarter-of-a-century another method of making illuminating gas has been developed, and on account of its simplicity and comparative economy it has largely replaced the older method. This so-called "water gas" is made by forcing steam on to hot coal, anthracite, or coke. The action is not distillation, but partial combustion. The steam oxidizes the coal to carbon monoxide, and is itself reduced to hydrogen. These are combustible gases, almost inodourous, and producing a nearly non-luminous flame. In this form, the gas is suitable for heating purposes. It is sometimes termed "fuel water gas." To fit this gas for illuminating uses, it is enriched—that is, impregnated—with hydrocarbons from petroleum, coal tar, or common oils.

A striking characteristic of water gas is its toxic power, due to the large amount of carbon monoxide. As this is without odour or irritant action on animal membranes, it may be breathed for a long while unconsciously. It possesses a degree of free affinity which causes it to combine with hæmoglobin to form a body (carbon monoxide-hæmoglobin) that is not susceptible of decomposition by free oxygen. Artificial respiration does not remedy this chemical asphyxia. Indeed, up to the present time, no satisfactory method of combating this condition has been devised.

In matters of this kind, the economic features are almost always the controlling ones. In spite of the progress of sanitary science, the general management of municipal affairs and of households is along unsanitary lines. It is known, for instance, that unfiltered surface water is unfit for drinking purposes; yet it is the common source of public supplies. So, in the matter of illuminating gas, the more highly toxic water gas has replaced the older form; the greater danger has been ignored in consequence of economy in cost. The protests made against its use years ago have been disregarded, and the result has been a steady increase in the number of deaths from gas poisoning. Fifty years ago such cases were rare; to-day they are common. Indeed, so far as Philadelphia is concerned, it is noted that illuminating gas and carbolic acid have replaced, for suicidal and accidental poisonings, the arsenic and laudunum of the civil-war period.

The cheapening of the gas supply, representing a reduction to nearly one-half the cost of old-fashioned coal gas, has led to its extensive use for heating purposes, more especially for cooking. Most of the apparatus furnished for these uses is constructed with but little regard to sanitary requirements. So far as the heating apparatus is concerned, it is used in about the same manner as our barbarian ancestors used their tent fires, except that the ventilating opening in the apex of the tent does not find any analogue in our own rooms.

The gas-stove, for cooking, does not represent so serious a menace to health as does the simple heating apparatus. The former is generally employed in the warmer season, when there is much natural ventilation. The most serious difficulty with it is the striking-back of the flame, which causes imperfect combustion, with the formation of offensive and poisonous compounds. These burners are generally constructed on the bunsen principle, but are not provided with a collar by which the air current can be controlled to adapt it to the gas current. Slight changes of pressure will cause interruption of the combustion, with the result that the flame passes back to the inner jet.

For the heating of bedrooms and bathrooms, now becoming a common practice in cities, apparatus has been designed which, though called "stoves," are merely batteries of burners. They appear to be rather wasteful, since there is little metal to be heated, and therefore little radiating mass. They are connected usually by a cheap grade of tubing, which soon becomes brittle and leaky. A highly objectionable feature is a stopcock attached to the stove, so that the gas supply can be turned off at that point and the connecting tube still remain open to the flow of gas. If this tube leaks, gas continues to flow out into the room. In this way many accidents to life and to property are caused. The convenience of this lower valve leads to its frequent use. During the past winter I have had considerable experience with these appliances, and I have found them more than once leaking so badly that a flame an inch long could be obtained from points in the connecting-tube.

The modern water gas is of such insidious nature that a sleeper can easily absorb a fatal quantity without being aroused. Let us suppose that the condition of the atmosphere is such that at each inspiration 1-1000th of a grain of the carbon monoxide present is absorbed. After the first inspiration, the blood will contain this quantity, and the equivalent quantity of hæmoglobin will be thrown out of function. At the next inspiration, another 1-1000th of a grain will pass in; but the first portion will remain, so that now 1-500th will be present. At the next inspiration the quantity will be increased to nearly 1-333th, and so on. Hüfner states that 1 gramme of hæmoglobin will take up 1·3 c.c of carbon monoxide. Da Costa gives the average of hæmoglobin in normal blood as 14 grammes to 100 c.c.. Therefore 18·2 c.c.—say, 20 c.c. —of carbon monoxide would render the hæmoglobin of 100 c.c. of blood useless; 20 c.c. of carbon monoxide weigh about 0·4 grain. From this rough calculation it is easily seen that even a small percentage of carbon monoxide can produce serious poisoning.

It is not appropriate to present the analytical data in detail, but the following table shows the principal ingredients of water gas and coal gas and their ordinary percentage by volume. Natural gas is inserted for comparison.

	Natural Gas.	Coal Gas.	Water Gas.
Carbon monoxide	0·5	6·0	45·0
Hydrogen	2·2	46·0	45·0
Methane	92·6	40·0	0·2
Ethene	0·3	4·0	—
Nitrogen	3·6	1·5	2·0
Carbon dioxide	0·3	0·5	4·0
Heat units per cubic foot	1000	735	322

It will be seen that unenriched water gas is principally hydrogen and carbon monoxide, and that its fuel value is rather low. When the gas is enriched, the so-called heavy hydrocarbons—compounds rich in carbon—are greatly increased, and the fuel value as well as the illuminating power is much improved. The following are partial statements of composition of enriched water gas, such as is commonly supplied in American cities. The figures, except for heating power, are percentages by volume. Not all the ingredients are given.

	No. 1.		No. 2.
Carbon monoxide	28·0	..	23·0
Hydrogen	37·0	..	36·0
Methane	19·0	..	21·0
Fthene	11·0	..	13·0
Heat units per cubic foot	650	..	658

As a comparison of heating power between the two types of gas, the figures given by Dr. E. G. Love for 1892 may be quoted: New York City gas (carburetted water gas), costing $1·25 per 1000 cubic feet, yielded 715,000 heat units per 1000 cubic feet. London gas (presumably all coal gas), at from 60 c. to 70 c. per 1000 cubic feet, yielded 668,000 heat units per 1000 cubic feet.

It would be a great mistake, however, to assume that because of these objections we should abandon the use of gas, or even go back to original coal gas. The object of this paper is to call attention to the dangers in order that renewed attention may be given to avoiding them. Gas is only dangerous when we lose sight of its composition and effects. Its advantages in the household are great. Properly used, it makes for sanitation instead of against it. At the cooking-range, it simplifies very much the details of food preparation, relieves the housekeeper of much hard labour, and saves time, temper, and trouble. The facility with which it may be used to obtain hot water at short notice is a great advantage, both to the healthy and to the sick.

The need in regard to the use of gas in the house is better apparatus and better connection of that apparatus with pipes. Gas producers and sanitary authorities should join hands in enforcing regulations in these respects. Let me take up some of these reforms in more detail. I suggest that the sale of inferior tubing should be forbidden. Excellent rubber tubing can be obtained for a reasonable price. Taking into consideration my own experience last winter, I should say that the higher-priced tubing is the more economical, for it outlasts by a long while the inferior grade, which often leaks. It is sometimes but little else than an imitation of rubber; its quality being concealed by a brilliantly coloured covering. I have seen this tubing become in a short time so brittle that it could be broken like a dry twig.

Gas-stoves for heating rooms should not have stopcock connections at the base unless attached by metal tubes with tight joints to the house mains. If attached by rubber tubes, there is great danger of the gas being only shut off below. This method of turning out the stove is the usual one with women and children who cannot conveniently reach the higher burner. The apparatus, however, should be so constructed as to prevent the rubber tube, even when of the best quality, remaining in free connection with the house main when the gas is not lighted.

Improvements should be made in the room stoves by which a larger radiating effect could be obtained by a given gas consumption. So far as I have been able to judge, the principal heating effect is the distribution of the products of combustion through the room. This, of course, is insanitary, and doubly so, because the shortness of heat forbids the free opening of windows. I believe that stoves for heating purposes should be placed only where the products of combustion can escape freely to the chimney. It must be borne in mind that the carbon monoxide poisoning is not the only danger in the use of gas. The products of normal combustion are more or less toxic, and the products of imperfect combustion are still worse. All burners on the bunsen principle should be provided with collars for controlling the air supply; and the dealers in these articles should be expected to instruct purchasers in the use of the collar. The escape of the partially burned hydrocarbons resulting from the striking-back of burners is very detrimental to health.

The use of illuminating mantles with gas has become very common of late years, and is a great advantage in several ways. The mantle, however, may interfere with proper combustion. It is not at all uncommon to notice a disagreeable odour proceeding from these burners. This is usually due to displaced or worn-out mantles. The rubber tube connecting the ordinary drop-light with the house main is apt to be a source of danger for the same reason as that noted in connection with the stove; the gas may be turned off, for convenience, at the base of the light, instead of at the original attachment, and thus may leak into the rooms. These points may seem trifling, but practical experience has shown that the dangers exist. A rational co-operation of the makers of gas and gas-stoves on the one hand with physicians and sanitarians on the other will greatly improve the condition of the air of our living-rooms.

The mortality statistics of Philadelphia and New York show strikingly the increase in the poisonous qualities of illuminating gas since the introduction of water gas. Both cities have been extensive users of gas for more than fifty years. A report presented in 1854 by the Trustees of the Philadelphia Gas-Works to the City Council states that during the preceding year 250 million cubic feet of gas had been manufactured. This was, of course, for the old city alone, as the Consolidation Act was not approved until February, 1854. Deaths from poisoning by illuminating gas do not occupy a place in the mortality reports of Philadelphia or New York until about twenty years ago. For New York, I have the figures given by Dr. Witthaus in Witthaus and Becker's "Medical Jurisprudence and Toxicology," and the report of the New York Board of Health for 1902. The figures given by Dr Witthaus are in summary as follows:—

New York Deaths Attributable to Illuminating Gas Poisoning.

	Accidental.		Suicidal.
From 1867 to 1880—14 years	13	..	3
From 1880 to 1892—13 years	157	..	45

Up to 1887 the entries are very few; for the last four years of the second period above given the data are:

	Accidental.		Suicidal.		Accidental.		Suicidal.
1889	33	..	11	1891	35	..	19
1890	36	..	4	1892	53	..	11

The report for 1902 gives: Suicide by "asphyxy" (hanging and strangulation excluded), 118; deaths by inhalation of "noxious gases" (not suicidal), 235.

As a cause of death, illuminating gas first appears prominently in the Philadelphia reports for 1899; but the Board's reports for 1897 and 1898 do not give detailed statements, and the sudden appearance of this factor may be apparent only. The data are also somewhat confused by the introduction of an item "suffocation," without further specification. I have endeavoured to secure a little more significance to this by showing the proportion of deaths under one year and over 15 years attributed to it. I suspect that a notable proportion of suffocations in adults is due to gas poisoning.

Abstract of Philadelphia Mortality Reports.

Year	Suffocation—Special Cause not Given.			Suffocation by Illuminating Gas.		Suicide by Illuminating Gas.
	Total.	Under 1 Year.	From 20 to 80 Years.	Total.	Under 15 Years.	Total.
1893	No entry.	..	..	No entry.	..	No entry.
1894	1	..	1	..	..	1
1895	1	1	..	..	..	
1896	No entry.	..	..	No entry.	..	No entry.
1897	..	..	No detailed statistics.	..	..	
1898	..	..	..	..	..	
1899	27	22	5	16	1	30
1900	23	12	9	5	1	19
1901	62	25	31	1	0	26
1902	42	18	16	7	0	36
1903	50	21	21	29	2	45

The Philadelphia classification differs considerably under different administrations, and some of the terms used are confusing. It is evident that, although suicide is an important factor in mortality statistics, it is not a cause of death in the sense that pneumonia or yellow fever is.

Gas and Oil Engines in Sweden.—According to the report of H.M. Consul at Stockholm (Mr. A. S. MacGregor), during 1904 the use of gas, gasoline, and oil engines increased considerably in Sweden. Of gas-engines, the suction gas variety seems to take the first place, and generally in sizes up to about 100-horse power. They are mostly employed in factories and for electric power stations, but are also used for boats. The majority have till now been imported from the United Kingdom and Germany; but the home manufacture is increasing. They are, without exception, of the four-cycle type. Gasoline or benzine motors are mostly of small sizes, such as 3, 5, or 7 horse power; they rarely exceed 40-horse power. Oil-engines are to be found of all sizes, from 1 up to 200 horse power. These engines are exclusively of Swedish make, and several of the most important works have taken up their manufacture on a large scale, for both home and export.

Irish Association of Gas Managers.—As already announced, the annual meeting of the Association will be held at Dundalk next Tuesday. According to the programme issued by the Hon. Secretary, Mr. James Whimster, the business will be transacted in the Council Chamber of the Town Hall, under the presidency of Mr. George Airth, the Engineer and Manager of the Dundalk Gas Company. Mr. H. O'Connell, J.P., the Chairman of the Urban District Council, has consented to open the proceedings, which will comprise the presentation of the report of the Committee, the admission of new members and the election of office-bearers, and the reading of the President's address and the papers. Of the latter, there are two: "Description of a Modern Sulphate Plant adapted to a Small Gas-Works," by Mr. C. B. Outon, of Inchicore, Dublin; and "The Working of Generator Settings with External Producers," by Mr. D. W. Tooms, of Fermoy. In addition, the members will be invited by Mr. R. Bruce Anderson to discuss the following proposition: "That, in view of the increase in the day consumption which has taken place of late years, 60 per cent. of maximum daily output may now be considered sufficient gasholder storage." On the invitation of the Directors of the Dundalk Gas Company, the members will dine in the Market House; and the next day they will be joined by their lady friends in an excursion to the Boyne Valley.

INCLINED RETORTS AND LONG-DISTANCE GAS DISTRIBUTION AT ST. GALL.

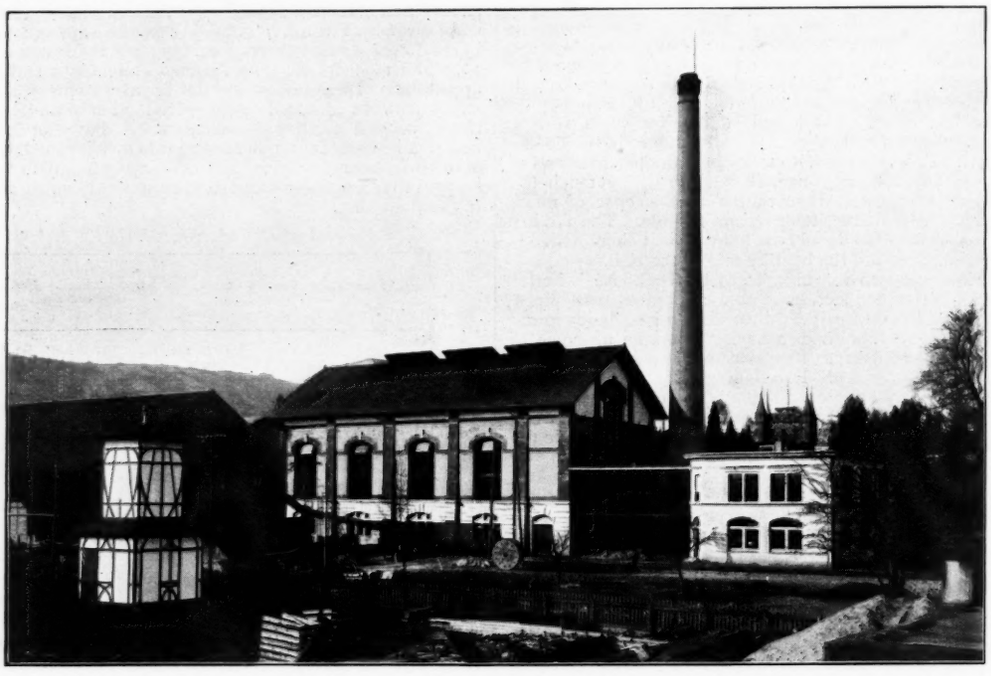
By Herr H. ZOLLIKOFER, Manager of the St. Gall Gas and Water Works.

[Abstract Translation of a Paper read before the German Association of Gas and Water Engineers, at Coblenz, June 30, 1905.]

THE RETORT-HOUSE WORKING.

The old installations of horizontal retorts at the St. Gall Gas-Works gave, on the yearly average, a make of 9570 cubic feet per retort-day. Some of these retorts were 2·6 metres (8·53 feet) and others 3·0 metres (9·84 feet) long. On the other hand, inclined retorts (11·7 feet long) at other gas-works gave, on the yearly average, a make of 10,480 cubic feet per retort-day. The capital expenditure on the installations, however, was, for the settings of horizontal retorts at St. Gall, £4 16s. 3d. per 1000 cubic feet make per diem; while for the settings of inclined retorts it was approximately £9 4s. 6d. Similarly a make per retort-day of 14,300 cubic feet was to be expected with 4½ metre (14¾ feet) retorts, and a make of 19,770 cubic feet per retort-day with 6 metre (19·7 feet) retorts. Now the new works were required to furnish a make of 1,270,000 cubic feet per diem; and the production aimed at was 1,144,000 cubic feet of coal gas and 247,000 cubic feet of water gas per diem—the latter to be made on the Humphreys and Glasgow system.

According to the tabular statement in the "JOURNAL" for March 4, 1902 (p. 542), out of 8087 inclined retorts in Great Britain 69 per cent. were 20 feet long. This length seemed most suitable. The author visited the works of the South Metropolitan Gas Company and the Gaslight and Coke Company in London, and was so satisfied with his inspection of the inclined retorts there that he considered it unnecessary to go on to the Granton works at Edinburgh, as he had originally intended. He gratefully remembers the kind reception and friendly advances of English colleagues on this occasion.



GENERAL VIEW OF THE ST. GALL GAS-WORKS.

The Stettin Fire-Brick Works guaranteed a make of 600 cubic metres (21,200 cubic feet) of gas per retort-day with retorts 6 metres (19·7 feet) long; and the order for the erection of the settings was given to them. In place of twelve settings containing in all 108 short retorts, only six settings, containing 54 long retorts, had to be built. The cross section chosen for the retorts was 600 mm. by 400 mm.—say, 23½ in. by 15¾ in. The actual cost of erection for the two types of installation is shown in the following comparative statement:—

Length of retorts, metres	6·0	3·57
,, ,, ,, feet	19·7	11·70
Retort-house	£3,595	£6,330
Settings, complete, with drying	10,220	12,960
Coal-breakers	375	275
Coal elevators and conveyors	485	1,395
Coal-receivers	635	785
Coke-conveying troughs in the retort-house and to the coke-sheds	1,285	1,740
Total	£16,595	£23,485

Thus the total cost per 1000 cubic feet per diem productive capacity was £14 10s. for the long retorts and £20 10s. 6d. for the short ones; while taking the cost of erecting the settings alone, it works out per 1000 cubic feet productive capacity per diem at £8 18s. 8d. for the long, and £11 6s. 7d. for the short retorts. If the daily productive capacity of 1,144,000 cubic feet is assumed to correspond with an annual output of 333,800,000 cubic feet, then the capital outlay per 1000 cubic feet per annum is—

	Feet.	Feet.
Length of retorts	19·7	11·7
For the retort-house	2·58d.	4·55d.
,, ,, settings	7·35	9·32
,, ,, coal breaking and conveying plant	0·62	1·20
,, ,, receivers	0·46	0·56
,, ,, coke-conveying plant	0·92	1·25
Total	11·93d.	16·88d.

The long retorts therefore secure an economy of 30 per cent. in capital outlay on plant, without taking into account the saving in ground. The area covered by the retort-houses amounts to 5630 square feet for the long retorts, against 9838 square feet for the short ones. There is thus an economy in ground space of 42 per cent. The area occupied by the retorts thus amounts, for every 1000 cubic feet maximum daily production, to 4·92 square feet with the long, and 8·6 square feet with the short retorts.

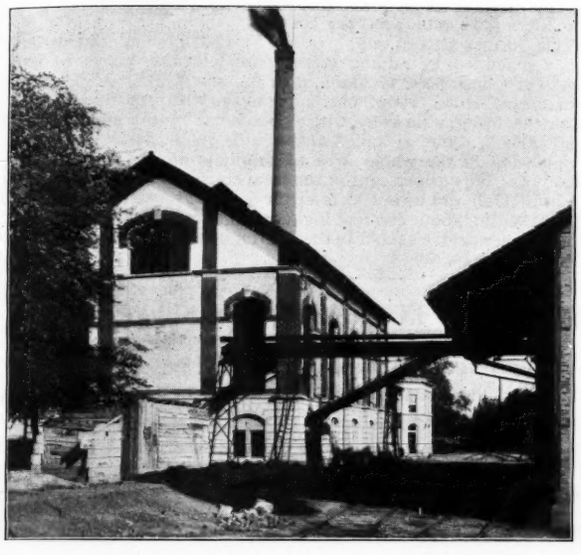
The guarantee trial of the settings extended over six days. Two settings, comprising eighteen retorts, were in action for this trial. There were put in 540 charges; and the producers were filled up 132 times. The results are given in the following statement:—

Six Days' Guarantee Trial of 19·7 Feet Inclines.

Coal carbonized	221 tons.
Gas made	2,453,440 cubic feet.
Make per ton of coal	11,102 ,, ,,
Average weight of charge	916·7 lbs.
Coal charged per retort per diem	40·9 cwt.
Gas made per retort per diem	22,715 cubic feet.
Coke made—percentage of weight of coal carbonized	65·3.
Average weight of coke for each charging of producers	598 lbs.
Unconsumed coke recovered from producers throughout the trial	174.17 cwt.
Net consumption of coke in producers as a percentage of the weight of coal carbonized	12·0.

The following statement gives some of the corresponding figures for the average results of the ordinary working of the new settings during the year 1904:—

Number of setting-days	862.
,, ,, retort-days	7,423.
,, ,, charges	37,976.
Average weight of charge	862 lbs.
Coal charged per retort per diem	38·47 cwt.
Make per ton of coal	10,765 cubic feet.
Gas made per retort per diem	20,872 ,, ,,
Consumption of coke in producers as a percentage of the weight of coal carbonized	12·1.



RETORT-HOUSE, WITH GAS OUTLET MAIN AND MERZ CONVEYOR TO THE COKE SHED.

Gas-works of medium size could erect such settings only if they have either very large gasholder accommodation, or water-gas plant. Without one or other of these, they would find it impossible to arrange to meet the necessary increase and decrease in make.

Two stokers are required on the drawing and one on the charging stage; and if not more than two settings are in action, they attend to the furnaces also. With two settings only, the stage work occupies them for 3½ hours out of a 12-hour shift, and the furnace work 1½ hours. With more than two settings in action, two furnace men are also required. The retorts are charged five times in twenty-four hours. An engine attendant looks after the conveying plant.

THE HIGH-PRESSURE DISTRIBUTION.

The new gas-works, as already mentioned, were required to meet a maximum daily output of upwards of 1,270,000 cubic feet. This make would be reached in less than thirty years, even supposing that the distributing area was not extended and the rate of increase of consumption was not greater than hitherto. The choice of a site for the new works was attended with many difficulties, owing to the fact that the town of St. Gall and its outlying townships are shut in between two high ranges of hills. The bottom of the valley is barely 1650 feet wide at its broadest part. The lowest point of the valley, at the village of Bruggen, is 2054 feet above sea level; the highest point in the town of St. Gall is at an altitude of 2257 feet. The highest point of the range of hills to the north of the town is 2611 feet above sea level, and the highest point of the range to the south is 2915 feet. The greatest difference in level in the bottom of the valley is therefore 203 feet; but between the lowest point of the valley and the highest point on the hills which has to be served with gas, there is a difference of height of 604 feet.

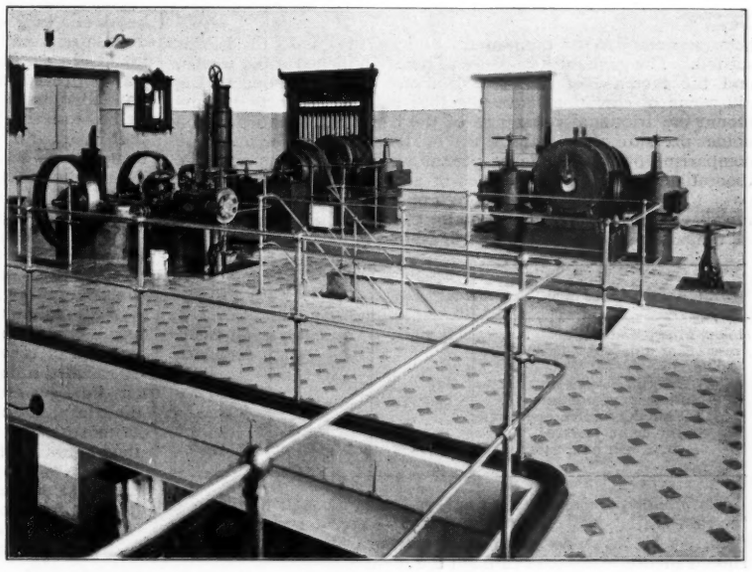
Schemes for the new station were more or less worked out for eleven different sites. Finally a site on the Lake of Constance, adjoining the St. Gall pumping-station, was decided upon. This site lies 1322 feet above sea level, and therefore 732 feet below the lowest part of the St. Gall valley. It is connected by a railway line, 0·87 mile in length, with the small station of Horn on the Swiss railway system. This station is nearer Constance, whence the coal is brought than, is the more important station of Rorschach, which also is not far from the new works.

The whole installation comprises—

(*a*) The new gas-works, with gas-pumping plant, adjoining the town water-pumping station, at a height of 1322 feet.
(*b*) The gasholder station in St. Gall, at an elevation of 2145 feet.
(*c*) The distributing system in the town and outlying places, varying in height from 2054 to 2658 feet.
(*d*) The distributing system of the district on the Lake of Constance, which is also supplied from the new works, varying in height from 1312 to 1377 feet.
(*e*) The trunk or feeding main between the gas-works and the gasholder station.

There is a difference in height between the gas-works and the holder station of 823 feet, or in round figures 820 feet. The increase of pressure of the gas, due to this height, is about 7 inches for coal gas, and about 5·6 inches for a mixture of coal gas and water gas. The gas-pumping plant consists of two No. 10 Enke's blowers, which are driven by a 16-horse power alternating current motor. The gearing is so arranged, with six different speeds, that any total volume can be pumped. The maximum capacity of each blower is 950 cubic feet a minute at a pressure of nearly 17 inches. By changing the 16-horse power motors for others of 32-horse power, the capacity of each blower could be raised, with 130 revolutions, to 1870 cubic feet per minute, at a pressure of 72½ inches.

The town of St. Gall, which has a population of 33,500 and is the centre of the embroidery industry of Eastern Switzerland, is over 6 miles from the site of the new gas-works on the Lake of Constance. The trunk main from the works to the gasholder station in the town is 6·32 miles in length, and has a diameter of 13⅜ inches. It will be remembered that the gas-works of St. Margrathen had earlier adopted high-pressure mains for the supply of holder stations in several distant townships in the valley of the Upper Rhine; and in the scheme for the St. Gall gas supply, which was projected in 1900, provision was made for gas-pumping plant on the Lake of Constance. The object of this plant was to force the gas through the trunk main to the distant and elevated holder station at such a high pressure that the diameter and cost of the main would be reduced to a minimum. The principle was the same as that involved in the high-tension cables of electricity works, and precisely followed in the high-pressure gas-mains of various London gas-works. The author has from time to time published technical communications on the system of high-pressure feeding mains; and he designed the pressure-raising plant which was installed by Herr Kohler at Metz in 1899. M. Ad. Bouvier, of Lyons, has made a report on this system of gas compressing.* There is at St. Gall, in addition to the high-pressure main already referred to from the new works to the gasholder, a similar compressing plant which was completed in 1900-01. It was originally worked by a Hillebrand



INTERIOR OF THE EXHAUSTER HOUSE, SHOWING THE ELECTRIC SIGNALLING APPARATUS CONNECTED WITH THE GASHOLDER.

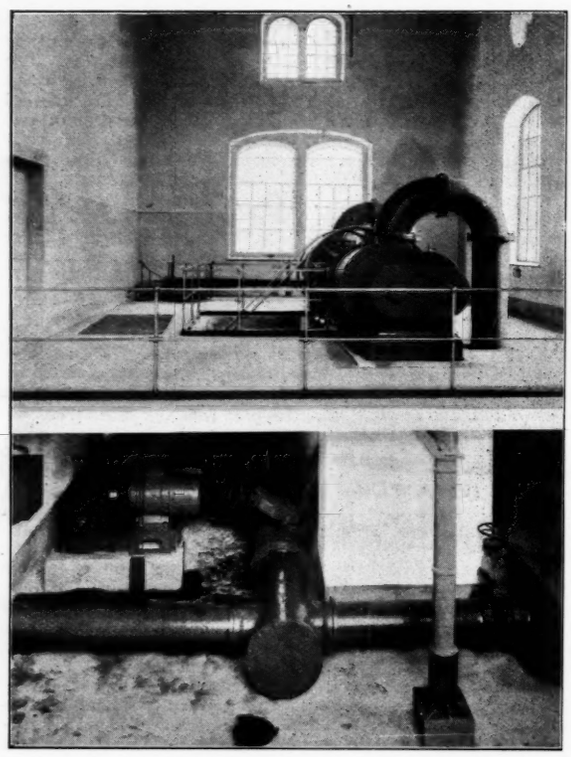
blower; but this was later changed for a Sturtevant fan, which is still in use.

It has so far not been possible to carry out completely the projected scientific investigations on the high-pressure mains, which

* See "JOURNAL" Vol. LXXX., p. 624.

the author is undertaking in collaboration with Dr. Fliegner, Professor at the Zurich Polytechnic. The author hopes confidently that they will still be carried out; and in that case Dr. Fliegner will publish the results in the technical journals.

The holder station at St. Gall comprises two single-lift gasholders, each about 124 ft. 6 in. in diameter, rising to 26 ft. 10 in., and of 328,000 cubic feet capacity. There are electrical indicators between the works and the holder station, so that the position of the gasholders can be read off at any time at the works. The holder pressure is 44-10ths of an inch. So far, the maximum demand on the works and trunk main has been 798,000 cubic feet per diem; and it has not up to the present



Interior of the Compressor House.

been necessary to use the blowers to drive the gas to the holder station. The gasholder pressure of nearly 6 inches at the works, and the increase of pressure of about 5·6 inches due to the difference of elevation, have together sufficed hitherto to surmount the frictional resistance of the trunk main and the gasholder pressure of 44-10ths at the holder station. The following comparison of the results of preliminary observations with the theoretically calculated volumes of gas which the main should pass shows how near is the agreement between them. The formula used is the ordinary one for the flow of gas in pipes, with all dimensions stated in the metric system of measures.

Data Obtained from	Calculation.	First Observation.	Second Observation.
Holder pressure at works	151 mm.	151 mm.	151 mm.
Pressure at inlet of (station) gasholders—			
(*a*) With inlet valve shut . .	293 ,,	289 ,,	—
Increase of pressure. . .	142 ,,	138 ,,	—
(*b*) With inlet valve open, and 987 cubic metres (35,880 cb. ft.) per hour passing .	—	—	112

The fall of pressure, when gas is passing through the main at the rate stated, is therefore 151 + 138 − 112 = 177 millimetres (nearly 7 inches). At this fall of pressure, the quantity which should theoretically pass through the main is :—

$$Q = \sqrt{\frac{d^5 \times h}{11{\cdot}45 \times s \times l}} = \sqrt{\frac{350^5 \times 177}{11{\cdot}45 \times 0{\cdot}574 \times 10200}} = 901{\cdot}6$$

cubic metres (about 31,820 cubic feet) per hour. The volume of gas actually passed through the main is therefore 9·54 per cent. more than the theoretical volume deduced from the formula.

A naphthalene washer is used at the works, and there have consequently been no blockages in the 6·32 miles length of main, notwithstanding that it passes over a large ravine and a deep railway cutting. The great difference in elevation between the gasworks and the district supplied is responsible for an increase in the volume of the gas. Taking the average height of the consumers' meters as nearly 2200 feet, the increase in volume of the gas would be 3·73 per cent., as the following calculation shows: The average height of the barometer at 400 metres (1312 feet) above the sea level would be 722 mm. (28·42 inches), and at 670 metres (nearly 2000 feet) it would be 696 mm. (27·41 inches). Then 100 : v^2 : : 696 : 722 or

$$v^2 = \frac{100 \times 722}{696} = 103{\cdot}73,$$

which shows that the volume has increased by 3·73 per cent. If a consumption of 150 litres (5·3 cubic feet) per hour is required to give in St. Gall a light of 15 Hefners (13·1 candles), then the gas at the works must give the same light with a consumption of only 145 litres (5·12 cubic feet) per hour.

The former area of supply of the St. Gall gas undertaking has been extended by adding thereto the following places on the Lake of Constance: Goldach, near the new works, with 2300 inhabitants; Horn, about one mile away, with 700 inhabitants; Rorschach, 0·68 mile away, with 10,000 inhabitants; and Steinach and Arbon, about 2¼ miles away, with 7000 inhabitants. The population of the whole area of supply is now 73,000. In the year 1904, fully 97 per cent of the total consumption was disposed of in St. Gall and its outskirts—over 6 miles away from the works, and standing about 820 feet higher; while only the remainder of about 3 per cent. was sold in the district on the Lake of Constance near the works.

STOPPAGES IN METERS AND SERVICE-PIPES.

By Irvin Butterworth, of Grand Rapids (Mich.).

[A Paper read at the Meeting of the Western Gas Association.]

The majority of the cities in which the gas companies represented in this Association do business are located in the northern half of the United States, where the winters are so long and severe that much trouble is experienced from the stoppage of services, meters, and house pipes by deposits of frost and water condensed out of the gas. This is particularly true of the most northern cities; and with the exception of those in the extreme South, none of the companies are entirely exempt from this trouble. In this paper I wish in the first place to point out the seriousness of this imperfection in the gas business of to-day; and, in the second place, to mention and comment upon some of the remedial measures which have been proposed for its relief, or have already been applied thereto with more or less success in European countries.

It is my firm conviction that the time has gone by when a gas manager can afford to content himself with following the methods now in vogue in Amer.ca for treating the routine difficulties incident to the distribution of gas in extremely cold weather. It no longer should suffice, nor indeed does it suffice, for a gas company to resignedly and complacently assure the consumer who suddenly finds that his supply of gas is cut off—say, in the early hours of a long winter evening—by an insidious and unsuspected deposit of frost in his service-pipe, that such an interruption is now and then unavoidable in the gas business; that there is no way of preventing an occasional stoppage of this kind; and that a man will soon be out to free his service-pipe of the obstruction and restore the flow of gas. I feel so strongly on this subject, that I regard it as nothing short of an actual calamity for a gas company to have even one of their consumers thus suddenly deprived of his supply of gas on a single occasion. This may seem like an extreme view, but it must be remembered that people nowadays expect, and are warranted in expecting, a much greater degree of perfection, refinement, and reliability than was formerly to be found in the mechanical devices and means by which the common necessities, comforts, and conveniences of their every-day life are supplied.

The manufacture and distribution of gas have been carried on as a business for a hundred years; and the thinking layman, in this age of mechanical progress and refinement in other long-established industries, expects, and has a right to expect, that by this time gas men have devised means and methods for ensuring the continuity of the gas supply at his premises in winter as well as in summer. And yet during three months of the winter of 1903-4, in the little city of Grand Rapids, where the distribution of gas is accomplished along rather better lines than the prevailing good practice of the day—most of the service-pipes being boxed in tar concrete—there were 3000 individual interruptions of the gas supply due to frost and water in the pipes and meters. Detroit had relatively as many; and if the companies in other cities should make an honest confession, the disclosures by each of them would be equally discreditable to the gas business in these modern times. I am aware that the winter mentioned was exceptional in the severity and persistency of its cold weather; but the inconvenience, discomfort, and distress, not to say the actual damage, that gas companies cause their consumers, even in average winters, by their failure to provide some sure preventive of these interruptions, are a sad commentary on either their engineering skill or their business judgment.

Furthermore, gas is now used in the average household for so many different and most important purposes, that an unexpected stoppage of the supply by day or night, but particularly by night.

has become a much more serious matter to the consumer, and therefore to the gas company, than formerly. Time was when the gas was used for light only, and, in many cases, in but two or three rooms in the house. Lamps or other means were always conveniently at hand for obtaining light, from oil or otherwise, on short notice, in the event of the failure of gas. The sudden stoppage of the supply of gas under these circumstances was not a very serious matter; and consumers of those days were patient and forbearing. But nowadays, especially if the company's new business department has been doing its full duty, the average consumer depends altogether upon gas, not only for lighting his house throughout, but also for cooking, for heating water, for warming some of his rooms, and for other purposes, with no other means at hand as a quick substitute for the gas for either purpose. Interruption of the gas supply in such cases cannot be otherwise than a most serious matter to the consumer, and in the not infrequent event that the house at the time contains visitors, annoyance and humiliation add to the consumer's irritation and chagrin; while in case of sickness the consequences may be even calamitous.

It is considerations such as these that impel me to the conviction previously expressed—that gas companies, in northern cities at least, should not content themselves with following the present antiquated and inadequate methods of dealing with these troubles. It is not right, nor is it good business, for the company to wait until the unfortunate consumer telephones that he is out of gas, and then send a man, perhaps half-an-hour later, with a can of wood alcohol, a pipe-wrench, and a lantern, to cut the frost out of the service-pipe. This is "locking the stable door after the horse is stolen" with a vengeance—more especially from the consumer's standpoint. I admit that most companies have sought to reduce the number of these interruptions of the gas supply by laying all new services at a greater depth, and by keeping a list of all services that freeze up in the winter, and then so enlarging or protecting them during the following summer that their stoppage from this cause is not liable to recur. But this is only an imperfect and partial remedy. The following winter may be a much more severe one, resulting in a recurrence of the trouble in those same services and in its fresh appearance in many others; and even with no apparent difference in temperature conditions, services and house-pipes that do not freeze or stop up during one winter may, on account of the vagaries of frost and weather, and even from unknown causes, do so during the next. It is practically impossible to entirely anticipate and prevent in this way all freeze-offs and stoppages, although good work may be, and has been, done in this direction, bringing about as great a degree of immunity from these troubles as is possible under the present imperfect methods of treating and preventing them. But they still leave much to be desired; for, on account of what I regard as the increasing seriousness of allowing even one consumer to be on a single occasion without gas, I believe it is our duty, and greatly to our interest, to adopt some new and radical method calculated to completely prevent these difficulties.

Let us now see what choice of such measures we may have, and discuss briefly their relative merits. I will consider the following methods, some of which have been tried, while others have as yet been only proposed: Drying the gas by washing with sulphuric acid, by exposure to calcium chloride, to quicklime, and to calcium carbide, by compression, by air condensation in overground pipes or air condensers, and by the reduction of the freezing point of vapours contained in the gas by the admixture of alcohol vapour.

It will be observed that all these seven methods contemplate some treatment or manipulation of all the gas as it passes from the holder into the street mains, and that the first six contemplate the removal from the gas of the water vapour contained therein, or at least such portion of it as will render the remaining moisture insufficient to cause any trouble; for it is said to have been found that 0·6 per cent. of water vapour can be safely left in the gas—this being one-half of a total of 1·2 per cent., which is about the quantity that saturated gas contains as it leaves the holder under average pressure conditions and at a temperature of (say) 50° Fahr., or about 12 cubic feet of water vapour for each 1000 cubic feet of gas. I should feel that it would be safer, however, especially in extremely cold weather, to remove practically all the water vapour from the gas, if this can be economically accomplished. Obviously, if the vapour be removed, there will be no stoppages from frost or water; and an incidental benefit (which must not be lost sight of) would be the prolonging of the life of our meter diaphragms, which, as is well known, are greatly injured by condensation in the meters, especially when such condensation is not of an oily nature. It is generally recognized among gas men that the moisture in the gas favours the deposition of naphthalene, and so by drying the gas we "kill two birds with one stone"—getting rid of stoppages from both naphthalene and frost. To my mind, therefore, some method of desiccating the gas would be preferable, if a feasible and economical one could be found, to the introduction of alcohol vapour, which leaves all the moisture in the gas, allowing it to condense in the pipes and meters, and only aiming to so lower its freezing-point that it will not congeal. I confess, however, that this method is the only one at present in successful use, notwithstanding the fact that the desirability of distributing desiccated gas has long been recognized; the American Gaslight Association having discussed this question as far back as 1872. Let us consider these methods.

Drying by Washing with Sulphuric Acid.—This method contemplates passing the gas through some sort of material like pumice stone, wetted with sulphuric acid, which would absorb the water vapour out of the gas, and which could then be strengthened for re-use by driving the moisture out of the acid by heat. This method is apt to be the first one to occur to us on superficial consideration; but it is now generally recognized to be impracticable, because the acid would rob the gas of too many of its illuminants. Furthermore, a trial of this method in Germany in the winter of 1895-6 showed that it did not prevent stoppages of pipes from the congealing of the benzol. It is likely that no method of desiccation would prevent this. But benzol enrichment is not generally practised, particularly in America.

Drying by Exposure to Calcium Chloride.—This method contemplates passing the gas through, or bringing it into contact with, calcium chloride, which, by its affinity for water, would absorb the moisture out of the gas. It has been tried with success on the premises of consumers—for instance, in Cracow, Austria;* but, so far as I know, it has not been attempted anywhere as a means for removing the moisture from all the gas as it enters the street mains from the holder. This method would necessitate not only rather expensive apparatus, but the cost and difficulty of revivifying the material for use again would probably make it uneconomical.

Drying by Exposure to Quicklime.—This method would be similar to the preceding, and probably much more economical; but I cannot find that it has ever been tried on a large scale. From data furnished me by Dr. Harrop, I calculate that with gas at 50° Fahr. 1 lb. of freshly burned lime per 1000 cubic feet would suffice, if the gas were properly exposed to it, to reduce its moisture content to 0·6 per cent. A portion of this lime, equivalent to about 0·4 lb. per 1000 cubic feet of gas treated, could be afterwards utilized in the ammonia concentrator; leaving the net quantity of lime chargeable to the desiccation of the gas at about 0·6 lb. per 1000 cubic feet, costing (say) about 0·2 c. If enough lime were used to practically completely desiccate the gas, which would be preferable, it would cost twice as much, or (say) 0·5 c. While the first cost of the lime itself would, therefore, not be excessive, this method might nevertheless not prove so economical as some of the others considered, on account of the first cost of the necessary apparatus and that of handling the material.

Drying by Exposure to Calcium Carbide.—This is a method proposed (originally, so far as I know) in 1894 by Mr. F. Egner, who pointed out that calcium carbide "would make a most excellent dehydrating agent; the carbide taking up the water vapour and nothing else, and the resulting very rich acetylene being conducted along with the gas, and evidently doing it no hurt." He had in mind the possibility of using it for the purpose which we have under consideration. But, so far as I can discover, the experiment has never been tried, notwithstanding that the idea is very attractive. The apparatus for its use would be comparatively inexpensive. But, at present open prices, the carbide would cost about $70 per ton, or 3½ c. per pound; and 1 lb. of the commercial article (say, 90 per cent. pure) would absorb only about 10·5 cubic feet of water vapour, which would be the quantity contained in 875 cubic feet of gas at 50° Fahr. In other words, the carbide necessary to reduce the water vapour to 0·6 per cent. would cost 2 c. per 1000 cubic feet of gas treated, while enough to entirely desiccate it would cost 4 c. This method would therefore be expensive, notwithstanding that the resulting acetylene would enrich the gas to some extent. The enrichment would not be considerable, if coal gas were being made, particularly if the absorption should generate high temperatures, which would be injurious to the acetylene itself and also to the gas being treated. It is not likely, however, that this would be the case.

Drying by Compression.—This method contemplates compressing the gas, by an ordinary compressor or otherwise, to a point that would "squeeze out," as it were, enough of the water vapour to render the gas safe from freezing, and then releasing the gas into the mains at ordinary low pressure for distribution. As already stated, it is said that a residue of 0·6 per cent. of water vapour may be left in the gas with impunity. While this seems doubtful, it is a fact that the removal of even a small portion of the water vapour seems to have an astonishingly large effect in the reduction in the number of freeze-offs. An examination of the complaint books at Detroit during the winter of 1903-4 shows that there was a decided falling-off of complaints in the vicinity of their high-pressure pumping lines, notwithstanding that the gas was subjected to only 2 lbs. pressure. And yet compressing gas under 15 lbs. pressure removes only half its water vapour, which would, at 50° Fahr., leave about 0·6 per cent. in the gas. But to do even this would cost about 1½ c. per 1000 cubic feet, as artificial cooling would also be necessary. In fact, while compressing the gas would be a perfect preventive of freeze-offs and condensed moisture, as is shown by the experience of gas companies who distribute high-pressure gas only, yet compressing it for the sole purpose of desiccation would be much more expensive than some of the other methods named. Consideration of this method brings strikingly to our attention one of the conspicuous advantages of high-pressure distribution—the absolute prevention of stoppages from freeze-offs and condensed moisture.

Drying by Air Condensation in Overground Pipes or Air Condensers.—This method of desiccating artificial gas has not, to my knowledge, yet been tried on a large scale, although it is success-

* See "JOURNAL," Vol. LXXV., p. 681.

fully employed by some natural gas companies in removing the entrained water from natural gas. Although the problem of its application to artificial gas is much complicated by the danger of condensing out the illuminants as well as the water vapour, I confess that this method appeals to me as offering great and promising possibilities. No machinery or chemical agencies are needed, and very inexpensive apparatus can be employed; while the labour cost would be extremely small. All that is required is a system of pipes laid above, but not directly upon, the ground, or almost any other sort of large air condenser, connected by means of valves with the holder outlet in such a manner that in cold weather the gas could be passed through this condenser, thus subjecting it to air condensation—the amount of exposure being varied by means of valves according to the fluctuations in the temperature of the air, and at no time cooling the gas to a lower temperature than it would reach in any event in passing through the mains and consumers' services. In this way there would be no greater loss of candle power than would occur if the device were not in use. In fact, we could err on the safe side by not chilling the gas below the temperature that it would reach in the warmest service in the city, and yet free it of enough of its moisture to secure, in my opinion, immunity from the frost and condensation troubles that now make the life of a gas man miserable in cold weather. With one intelligent man in charge of this air condenser, it could be manipulated with absolute nicety, producing exact and ideal results, if such were necessary. But, in my opinion, the apparatus would do its work sufficiently well for all practical purposes without painfully close watching or micrometer regulation. It would only be necessary not to chill the gas below the temperature it would reach in the warmest services; and as our troubles from frost and condensation would probably disappear before this point should be reached, the range of temperature fluctuation produced by the apparatus could safely cover quite wide limits. It would probably be necessary to provide duplicate condensers, in order that they might be alternately bye-passed to permit the removal, by steam, air, or other means, of the frost that would deposit in them from the moisture in the gas.

A conviction of the probable efficacy of this method is forced upon us by well-known experiences of many gas companies. The St. Paul Gas Company, during the winter of 1903-4, had much less trouble than usual from freeze-offs, when the opposite experience would naturally have been expected, simply because the weather was so very cold that the quantity of moisture in the gas as it left the holder was in the first place less than usual, and in the second place was nearly all condensed out before the gas reached the consumers' services. In Detroit, during the same winter, there was a system of partially overhead small distribution pipes running to and through various buildings at the gas-works. Some parts of these pipes kept continually freezing up until a large iron vessel, made out of 16-inch gas-pipe, which acted as an air condenser, was installed in the main feeder of this system as it emerged from the ground, and immediately the freezing ceased—the moisture, or enough of it, being thus removed. The United Gas Improvement Company have for years been in the habit of enlarging their lamp-post risers where they leave the ground; the enlarged portion serving as an air condenser, and thus practically preventing all freeze-offs. In Grand Rapids, about one-fourth of the gas consumers live on the west side of the Grand River, the remaining three-fourths being on the east side, where the works are located. The west side consumers are supplied through pipes supported, where they cross the river, on bridges some 600 feet long. An examination of our complaint-books shows that on the east side of the river there were, during the three coldest months of the winter of 1903–4, six times as many stoppages from frost and condensation per 100 meters as there were on the west side; the difference being wholly due to the exposure of the gas supplied to the west side to the cooling effect of the air as the gas passed through the pipes on the bridges, as other conditions were the same throughout the city. The proposed air condenser at the holder outlet would merely perform this desiccating function for the gas supply of the entire city, only it would do it more thoroughly and with more safety to the candle power, being at all times under full and easy control. It would be used, as I have said, only in extreme weather; being bye-passed or artificially cooled during the warm hours of mild winter days, and put into use again as the evening coolness and hours of maximum consumption came on. To my mind, this is the most promising desiccating method of preventing troubles from frost and condensation.

Reduction of the Freezing-Point of Contained Vapours by Admixture of Alcohol Vapour.—This is the only method that does not involve the desiccation of the gas; and, furthermore and unfortunately, it is the only method that is now in successful use. In fact, so far as I know, it is the only method that is now being tried, either successfully or unsuccessfully. It is the invention of Dr. Bueb, Chemist to the German Continental Gas Company, of Dessau; and it is a scheme and apparatus for introducing into the gas, as it enters the street mains from the holders, the vapour of wood alcohol, which so lowers the freezing-point of the water and other congealable vapours contained in the gas, including benzol, that they do not deposit in the pipes as frost or otherwise.* The apparatus is very simple and inexpensive, and consists of an elevated tank containing the alcohol, a regulator for controlling the rate of flow of the alcohol in the vaporizer, a vaporizer for volatilizing the alcohol either by steam or dry heat, and a pipe leading thence in the holder outlet. For temperatures down to 14° Fahr. about one-third of a pint of alcohol is needed per 1000 feet of gas, and for temperatures between 14° Fahr. and (say) 6° Fahr. below zero, about half a pint. As early as 1896, there were 29 gas-works in Continental Europe, principally in Germany, using this method, introducing the vapour only during the hours of evening consumption; and according to an advertisement in the "Journal für Gasbeleuchtung" for Dec. 3, 1904, the method is now being employed in no less than 193 different cities. I have recent letters from Dr. Bueb's associate, Herr von Oechelhaeuser, who assures me that the method is very successful, and is being extensively adopted and used in Europe. This somewhat surprises me, on account of the high cost of the alcohol used; but he explains that because of the absence of duty charges the cost of the alcohol in Germany is not prohibitory, as it would almost be in America. For instance, at 60 c. per gallon (the present price of wood alcohol in Grand Rapids), one-third of a pint, or enough per 1000 cubic feet of gas treated to prevent stoppages at 14° Fahr. or over, would cost 2½ c.; while half a pint, or enough to prevent stoppages at between 14° Fahr. and −6° Fahr., would cost 3¾ c. With our present output at Grand Rapids, even if we should use this method during only the three hours of maximum consumption, the cost in below zero weather would be about $30 per day; and, as a matter of fact, on account of the extensive use of gas during the daytime, it might be necessary, after all, to vaporize the alcohol during (say) 12 hours out of 24, which would make the cost about $65 per day. Of course, we should save the cost of the alcohol and labour now employed in freeing service-pipes in the usual way, and would prevent the annoyance of our customers, which is the chief object to be attained. This saving and result should, of course, be credited to each of the methods which we have been considering. We have experimented with this method in Grand Rapids during the past winter, vaporizing in the holder outlet, during a portion of our coldest weather, half a pint of wood alcohol per 1000 cubic feet of gas passing through it, with the result that we effected a very marked decrease in the number of freeze-offs. We should probably have eliminated them altogether had we not been obliged to put our make of gas, during the hours of heaviest consumption, directly into the street mains, bye-passing the holder. This gas, not having had the benefit of holder condensation, contained an excessive and abnormal percentage of water vapour, for the complete control of which the quantity of alcohol used was apparently insufficient.

Because of the fact that the gas enters the holder at a uniform rate throughout the 24 hours, but leaves it at widely varying rates, it seems that the proper location for the desiccating apparatus, whichever kind should be employed, would theoretically be on the holder inlet rather than on the outlet, as much smaller, and therefore less expensive, apparatus would thus be required. In this event, however, it would be necessary to keep the water in the holder tank covered with some kind of oil that would prevent the absorption of vapour by the dried gas. Though this could probably be successfully accomplished, I have treated this subject on the assumption that the apparatus would be placed on the holder outlet.

If I have not made any error in the foregoing calculations, it seems probable that the quicklime method would be much cheaper than the alcohol method that has evidently obtained so strong a foothold in Europe. But, in my opinion, the air condensation method would be the cheapest of all, both in first cost and in operation. While my investigations and experiments have not yet gone sufficiently far to warrant my stating this as a definite conclusion, it is at least evident, I think, from the foregoing discussion of some of the available and feasible methods of prevention, that gas companies should no longer jeopardize their own and their consumers' interests by following the present ancient and ineffective methods, on the plea that there is nothing better.

Summary of Discussion.

The President (Mr. O. O. Thwing, of St. Louis), having invited discussion on the paper, Mr. M'Adam, referring to the author's remark in regard to the cooling effect of the air on the gas passing through the pipes on the bridges over the river at Grand Rapids, asked whether any provision was made for preventing stoppages in these pipes by putting alcohol into them, as an excessive use of it would have a tendency to saturate the gas to such an extent that it would obviate obstruction. Mr. Miller pointed out that Mr. Butterworth had omitted to consider one result of drying gas to a marked degree. He (Mr. Miller) had had an experience with certain sections of the plant, where it was supplied with gas that had been compressed, which seemed novel. When they started the Algiers supply, they decided to use wet meters entirely, as they had a large stock of them; but they found that they had to fill them about three times a week. The dry gas would take the water out of the meters so fast that the gas would shut off. Then they changed them all and put in dry ones; and in the course of two or three months these meters were all slow. Examination showed that the dry gas had taken absolutely all the oil out of the leather, and the latter was passing gas like a sieve. They found similar conditions in other districts in the city where they were getting gas coming through the high-pressure system. While it might be a desirable thing not to have moisture or condensation in the meters, if they had the gas too dry, they would have trouble with the leathers. To overcome this, they asked the meter maker to supply leathers properly saturated, so that the gas would not take up the oil. But

*See "JOURNAL," Vol. LXVII., p. 461.

the situation was too serious, so they tried the scheme of oiling the diaphragms from the inside—taking the top off the meter and opening a valve, pouring the oil into the diaphragm, with some lampblack or graphite, oiling it from the inside, and then draining it out. They had tolerably good results from this. Still the oil was taken out of the leather, and very frequently they found it deposited in the meter in the shape of condensation. In one case, nearly half-a-pint of oil was taken out of a meter; and he identified the oil as being the same that had been used for the leathers. The President remarked that this could not have been found to be generally the case. Mr. Miller said it was not. Usually the leathers were left dry—the oil had disappeared entirely.

Referring to the drying of gas by air in overground condensers, Mr. Elbert expressed the opinion that it would not be an entire success. He thought there was no doubt that aqueous vapour could be removed by exposing a sufficient extent of condensing surface to the gas in its passage from the holder to the mains. It, however, would have to be large enough to take care of the gas on a maximum load. This accomplished, the vapour, reduced to water, would freeze, and must be removed again by heat, which at once spoilt the effect of the condensing apparatus. At St. Paul, they supplied a large proportion of the consumers in the east and west districts through mains on bridges. There were practically no frost cases in this territory; but the bridge-pipes required constant attention during winter, and had to be flushed with hot salt water, which was pumped from the drips. This system, or something similar, would probably have to be applied to the air condenser at the works; and this spoilt the effect desired. Mr. Elbert said he could not see the use of doctoring all the gas, with the danger of reducing the illuminating power, when only a small percentage of the consumers were ever troubled with frost. From Dec. 1, 1904, to May 1 last, which covered all their cases of frost for a year, they had 2714 complaints, a large number of which were duplicated—many times from one customer. Assuming, however, they represented individual consumers, and comparing them with the total number, they would average about one complaint to 5·5 consumers for the year, or each consumer requiring attention (say) once in 5½ years. It did not appear to him to be an "actual calamity" to fail to supply, partly or wholly, a consumer once in five years. If the average service did not freeze, why should any of them? The laying of a service in tar concrete as at Grand Rapids was, no doubt, a good preservative for the pipe; but it was by no means a non-conductor of frost. On the contrary, it was one of the best, as frost penetrated a compact mass, and remained longer than in a loose or disintegrated covering. The laying of a service at a great depth was little better than a moderate covering, and would not entirely remedy the frost trouble, whether or not a winter was severe. As a remedy, he would say a service should never be less than 1¼ inches or larger, and, when necessary, it should be laid in the centre of a wooden box or tube large enough to form a dead-air space, with the ends cemented or closed—this covering to extend through the wall. In no case should they allow a service to be levelled with stone or brick, or to extend through a wall without a box or tile around it. As to the house pipe and meter in exposed places, the dehydrator devised by one of the members—Mr. F. C. Shepard, of Minneapolis—was effective. As to the lamp-posts, some years ago, having much trouble with keeping the supply-pipes free from frost, he conceived the idea of setting every post to form a dead-space. This was accomplished by fitting boards tightly over the two slots in the base of the post, keeping it clear of dirt, and the bottom entirely free of any covering, the top of the post being plugged with a wooden block with an inch hole for the pipe to pass through. He found this remedy almost perfect, and the posts required very little attention.

Mr. Waring remarked that the author had not taken into consideration the water leaking into the mains running through low ground where they were laid in water. It seemed to him that where a great many ran through the bottom of the river there would be leaky joints admitting water which would destroy the effect of desiccation by resaturating the gas. With regard to putting oil on the surface of the water in the gasholder tank, it struck him that a variation in temperature would make the illuminating power fluctuate by the evaporation of the oil.

Mr. Wortendyke said one objection to desiccating gas was that it necessitated the introduction, between the outlet of the holder and the distributing system, of some apparatus which might cut off the gas from the entire city. This would be more serious than having a shut-off for a number of isolated consumers. Though alcohol might cost more and not do the work quite so well, there was absolutely no possibility of it cutting off the whole gas supply.

The President said one point which Mr. Miller had brought forward was rather obscure to him, and that was the removal of the oil in the meter by means of the dry gas. He could hardly understand how the oil should disappear. According to some experiments he had made, meter oil was not soluble in gas, but was soluble in oil condensed from gas. It seemed to him that if Mr. Miller's meter diaphragms bleached, he should have found a combination of the meter and the drip oil in those particular meters. It was for this reason that he asked Mr. Miller if he found the oil generally in the meters. Mr. Miller said he did; and he added that when the President used the word "bleached" he hit on the correct term—the leathers were almost white.

Mr. Butterworth then replied to the remarks of the various speakers. In answer to Mr. M'Adam's question, he said they used alcohol in the bridge lines at Grand Rapids, of course, in large quantity; but he did not believe this was the cause of the reduction in the number of freeze-offs in the district supplied through them, because it was evident, from the frost found in these pipes, that this was the place where the moisture had already been deposited out of the gas. As to Mr. Miller's objection to the drying out of the diaphragms, he said it was not necessary to dry the gas completely. They could dry it as much as was needed to prevent interruptions, and yet leave some moisture in the gas, so that the meter diaphragms would not be dried out. In this connection, he should like to ask some of the meter makers what their experience was with meters used by companies supplying high-pressure gas, which, of course, was dry gas. Mr. Elbert pleaded that the conditions in St. Paul were not bad, as they only had 2700 consumers affected by interruptions in their gas supply during the winter. He (Mr. Butterworth) thought that was very bad. He admitted himself that some of the 2700 complainers had duplicate—probably some of them had triplicate—interruptions. If he had 2700 different consumers out of gas in one winter, that would probably mean 4000 or 5000 interruptions in a town with not more than 15,000 or 16,000 gas consumers. He considered that was very bad. The device to which reference had been made was very good for particular services which were known to be liable to cause trouble; but, after all, it was only a makeshift. They never knew when these troubles were going to arise. They appeared where they were least expected; and when they did not occur in one severe winter, they might do so in the next, though it was perhaps not so severe. As to the possibility of an apparatus placed on the outlet of the holder interrupting the supply of gas to the city, he did not see why a condenser could not be placed in such a position and be perfectly safe. It should, however, be in duplicate, to allow for cleaning. He concluded by repeating that he should like to hear from some gas-meter maker whether he had had any trouble owing to the drying of the diaphragms of the meters in use by a high-pressure gas company.

On the invitation of the President, Mr. M'Ilhenny made a few remarks on this point. He said he was not aware that the question raised by Mr. Butterworth had ever been brought to their notice. There might be two reasons to account for this. One was that the distribution of gas under high pressure was of comparatively recent date, and the results, if any, had not made themselves manifest. He knew of no complaints in regard to meters used in measuring gas so distributed, as to any deposit or otherwise in the meters. As to natural gas, which was, of course, subjected to high pressure, he should say it was, as a rule, perfectly dry, and he would add that the conditions were ideal for meters measuring natural gas. He had seen meters opened which had been measuring natural gas for ten (possibly fifteen) years, and internally they were in as beautiful a condition as they were the day they were originally made—a filmy oil which was carried along with the gas being spread all over the interior. An evidence of the ideal condition under which these gas-meters worked was seen also in the fact that there were practically no repairs required. When natural gas was first distributed, the gas was occasionally taken off in close proximity to the wells, and then fine particles of grit accompanied the flow; but nowadays, on long-distance transmission lines, this was removed before the gas reached the towns. He thought sufficient attention had not been paid in the past to remove difficulties found with gas outside the works. He knew that if the excess of condensation were removed before it reached the meters, the expense of repairs and difficulties with meters would be very largely obviated by just such methods as those Mr. Butterworth advocated. The main cause of trouble in meters was condensation; and if this could be removed the meter would be benefited, and the company put to less expense.

The President, in closing the discussion, suggested that the subject was one which might well be followed up, and papers written upon it, until some definite device or system of preventing stoppages in service-pipes was arrived at. He thought it would be well if Mr. Butterworth would consent to carry on his investigations, and report to the Association thereon next year.

Mr. W. Townsend, son of Mr. H. Townsend, of Wakefield, has been appointed Assistant-Manager of the Warrington Gas-Works.

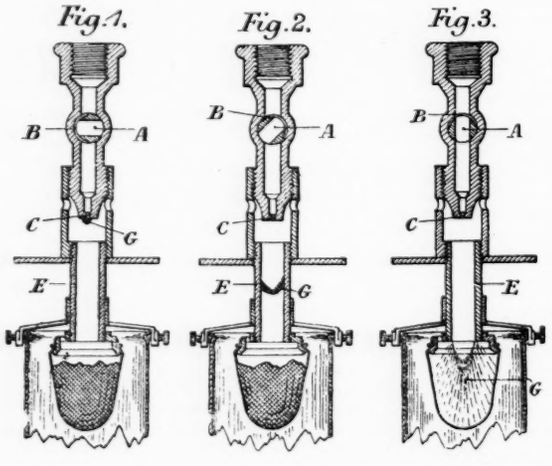
In the "Personal" column in the "Journal" for the 20th of June, we recorded the presentation of an address and his portrait to Mr. J. Okey Taylor, J.P., the Chairman of the Reading Gas Company, by his colleagues on the Board, in commemoration of his fifty years' connection with the Company as a Director, and of the eightieth anniversary of his birthday. A similar pleasing function took place on the 25th ult., when Mr. Douglas H. Helps, the Engineer and Manager, asked Mr. Taylor to accept from the officers a silver salver as a mark of their esteem and respect. In doing so, he referred to Mr. Taylor's long connection with the Company, and to the fact that the high position which it holds in the gas world is largely due to the great care and knowledge with which the Chairman has led it for so many years. Mr. Taylor was deeply touched at the kind feeling displayed by the officers, and expressed his warmest thanks to them for their gift. The salver bore the following inscription: "Presented to J. Okey Taylor, Esq., J.P., Chairman of the Reading Gas Company, by the Officers, as a mark of esteem and respect, on the completion of 50 years as a Director of the Company. July, 1905."

REGISTER OF PATENTS.

Gas-Burner with Internal Kindling Flame.—Mannesmann, O., of Remscheid-Bliedinghausen, Germany. No. 6074; March 22, 1905. Date claimed under International Convention, March 23, 1904.

This invention is based upon the observation that, with inverted incandescence gas-burners, a flame will burn at the gas-nozzle itself within the mixing-tube when the gas pressure is only slight, but that, on increasing the pressure, the flame is removed from the nozzle and travels to the exit opening of the mixing-tube; while, on again decreasing the pressure, it will return to the interior of the mixing-tube and finally to the gas-nozzle.

The patentee remarks: As, on turning open the gas-cock, the pressure at the nozzle gradually increases from nearly o mm. up to the pressure existing in the supply pipe, and on turning back the cock it gradually sinks to nearly o mm. again, a kindling flame situated within the bunsen tube can be utilized for igniting the burner flame. The gas can be supplied to the kindling flame by providing the gas-cock with a small opening which is perpendicular or inclined to the main orifice and which comes into action when the main orifice is closed. This opening can be provided with a regulating device of any known construction by means of which the kindling flame can be adjusted to the desired size. The gas-cock can also be so constructed that in a certain position of it a sufficient quantity of gas passes through for maintaining the burner flame; that in a second position only the kindling flame is maintained; and in a third position the passage of gas is entirely prevented. For preventing the extinguishing of the flame burning in the interior of the lamp, by stagnant combustion gas, there must be provided above the gas-nozzle an opening through which the combustion gases can escape, unless the dimensions of the burner are made so great that the combustion gases become diffused in the outer air. The opening for the combustion gases is also not necessary for those burners in which the air supply enters directly from the outside into the mixing-tube either laterally of, or above, the gas-nozzle. In many cases—and, in particular, when the kindling flame is entirely surrounded by tubes which keep off every external draught—it suffices to reduce the kindling flame so small that it burns as a blue flame. The danger of



deteriorating the nozzle opening by means of the kindling flame is lessened when the gas-nozzle, or the part that serves for the kindling flame, is made of porcelain, steatite, or other suitable material that is a bad conductor of heat.

The lamp can be put into and out of action from any desired point of the gas-supply pipe if provided with a gas-cock which throttles the pressure down to a few millimetres, or even to a fraction of a millimetre, during the time when only the kindling flame is to burn; while during the entire or partial opening of it the large flame is produced for heating the incandescence body.

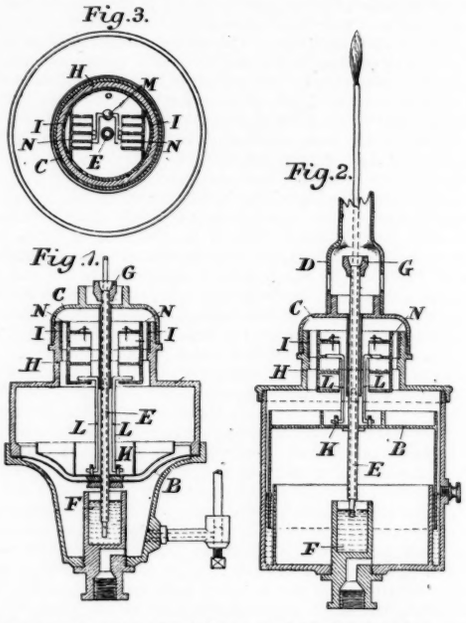
The illustration shows the invention as applied to an inverted incandescence gas-burner.

In fig. 1 the main opening of the gas-cock is closed, and only a small quantity of gas passes through the opening B for supplying the kindling flame G burning in close proximity to the gas-nozzle C. In fig. 2, the gas-cock is turned so that the main opening A is slightly opened while the opening B is closed. A moderate amount of gas now passes through the nozzle, causing the flame G to travel away from it and burn in the tube E. In fig. 3, the cock is turned so that the opening A is fully open, whereby the flame is caused to travel to the burner opening and thereby effect the heating to incandescence of the mantle.

Automatically Igniting and Extinguishing Gas-Lamps.—Hinden, A., of Neustadt a-Hdt, Germany. No. 7003; April 3, 1905. Date claimed under International Convention, April 16, 1904.

This invention relates to apparatus for igniting and extinguishing gas-lamps by liquid closure—that is to say, in which the gas pressure, in operating upon a diaphragm or a bell-float, effects the shutting off or the opening of the gas supply. The arrangement is such that the diaphragm or the float is arrested on sinking owing to a reduction of the gas pressure; so that the sinking takes place at certain intervals and the ignition and extinguishing only take place at the determined times.

Fig. 1 shows a vertical section of the apparatus operating with a diaphragm; this being in the lowered position. Fig. 2 shows a similar arrangement in the raised position; a bell-float being employed. Fig. 3 shows a horizontal section of fig. 1.



The apparatus consists of a casing containing the gas-pressure device B (diaphragm or bell-float) and of the screwed cap C, which carries the incandescence burner and its air-regulating tube D. To the middle of the gas-pressure device is fixed vertically the gas-supply pipe E of the burner, which pipe consequently rises and falls with the device. Its bottom opening dips into the vessel F, filled with mercury or the like, and is opened or closed by emerging from, or dipping into, the liquid.

The upper end of the tube E carries the nozzle head G, which, on the rising of the gas-pressure device B, enters the opening of the air-regulating tube D, so as to partially close it, in order that, at the moment of ignition, the air supply may be reduced, and thus the striking-back of the flame to the nozzle-head be prevented.

In the cylindrical upper part H of the casing is removably arranged a ring I, which carries the device for effecting the periodical igniting. This is arranged as follows: To the diaphragm or the top of the bell-float the two holders L, connected by a stirrup piece, are pivotally mounted in two loops K. The balance-weight M, or a spring, tends to turn the holders to the left, so as to press with their transverse arm against the switch body N, carried by the ring I, so that the arms, on the rising and falling of the pressure device B, slide in this body and are guided in a prescribed manner.

In the lowest position (as at fig. 1) the holding arms rest in the lowest recess of the switch body, in which position the supply of gas is cut off. The pressure device is then made to rise by the pressure, which is increased for the purpose of ignition. The holding arm then slides upwards along the wall O of the switch body until it presses inwards an inwardly movable flap, which closes an upper opening in the wall and moves the flap into such a position that the gas supply to the burner and the igniter are open and the ignition is effected. At the side of the supply pipe of the burner is the supply pipe of the igniter, which also dips into the vessel F.

The gas pressure in the mains is now reduced to the normal again. The holder then sinks along the other side of the wall O into the first switch cell of the switch body, whereby it is prevented from sinking further, but the igniter supply is already again made to dip into the liquid. The igniter flame is thus extinguished, but not the lamp flame, because its supply pipe has its bottom opening situated higher than that of the igniter pipe. At the same time the flap falls back into its original position.

A second period of rising subsequently occurs for the purpose of extinguishing the main flame. The holder slides upwards against the left-hand wall of the pocket; and in pressing inwards, the flap sinks down against the other side of the wall into the next switch pocket, which allows the holder to sink lower, and thereby effects the extinguishing of the main flame.

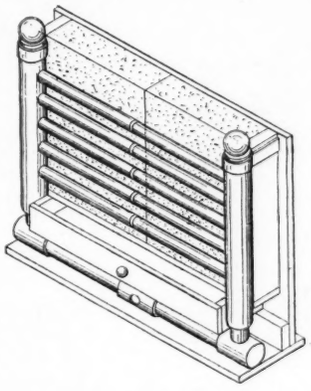
A third period brings the holder out of the switch pocket into the deepest switch cell; the holder pressing outwards the bottom flap and assuming the original position in the pocket whereby at the next operation the above described action is repeated.

Using Coal Gas as a Heating Agent in Stoves, Fire-Places, and the Like.—Noad, J., of East Ham, and Bell, F. H. A., of Queen Street, E.C. No. 19,625; Sept. 12, 1904.

This invention consists in employing, in fire-stoves or the like, a slow-combustion combustible body, composed (for example) of pulverized coke, peat-carbon, coal, or any mixture thereof, and causing the flames of an ignited mixture of gas and air to play upon it, "whereby a better calorific effect is obtained than where a non-combustible body (such as fire-clay or asbestos) is used for the gas-flames to play upon, and, withal, such a saving in the consumption of gas is consequently entailed, for any given heating effect, as will reduce the cost of heating by such agent, notwithstanding the needed renewal of the combustible body."

The combustible body is, preferably, used in slab-like form (as

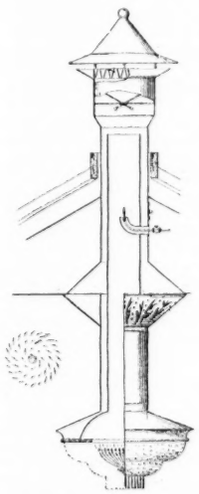
shown), and the fire-place is provided with an arrangement of pipes or conduits for a regulated mixture of gas and air; the pipes having jet holes for the escape of the gaseous mixture, and being so located that the bunsen flames "play gently and evenly on, and generally over, an



opposite surface of the combustible body and as nearly as practicable up to its edges, whereby it is caused to become a glowing radiant mass, which, while the bunsen flames continue to play thereon, slowly consumes and emits an intense and practically uniform heat due to its own slow combustion."

Sun-Burners.—Sugg, W. T., of Westminster, S.W. No. 18,431; Aug. 25, 1904.

This invention relating to sun-burners consists in the arrangement of the burners proper and in the construction of the body of the burner "whereby increased illuminating efficiency is obtained and the prevention of down-draughts is ensured." The patentee employs ordinary flat-flame burners; the jets being arranged to provide vertical instead of horizontal flames as usual. The burners are arranged in rings; each burner being so set that the width of the flame is tangential to an imaginary circle drawn through each ring of jets. By these means the largest possible amount of space is provided between each flame of the cluster of burners (without unduly increasing the diameter of the cluster) to permit the requisite quantity of air reaching all the flames, so as to "ensure proper combustion and increase the brilliancy of the flames." The products of combustion escape upward through a shaft (as before) provided with counterbalanced valves. To ensure a continuous upward current in the shaft, there is a gas-jet at a convenient point in the shaft to be always kept burning; and in order that this flame shall not be put out by the carbonic acid in the products of combustion passing up the shaft, a special supply of air is provided, by means of a pipe surrounding the jet and supply pipe, which will draw a supply of air from outside the shaft. There is an additional shaft outside and concentric with the products shaft, which second shaft is carried upwards into the cowl. The vitiated air passes through the grating to this second shaft, which thus becomes a ventilating shaft. Further, the second shaft serves to prevent the contact of the heated central shaft with the woodwork of the ceiling or roof—forming, in fact, an air-jacket by which the outer shaft is kept cool. The outer shaft is connected with the central shaft below the counterbalanced valves. The heat of the small jet of gas in the central shaft is "sufficient to overcome any tendency to down-draught when the valves fail to act under certain conditions, and the valves prevent the down-draught under certain other conditions."



Automatically Extinguishing and Re-lighting Gas-Burners.—Olsen, O. M. J., and Gates, W., of Paramatta, New South Wales. No. 20,191; Sept. 19, 1904.

A "peculiarity" of this invention is that, "while it may be operated by any predetermined maximum gas pressure, it is not subject to the influence of intermediate or varying pressures, by reason of a device suitably arranged for temporarily suspending the alternating action—such temporary suspension continuing for any period determined by the operator."

Fig. 1 shows the enclosing chamber and regulator with the operative parts adjusted in their normal position to communicate with the pilot light, and ready to be operated. Fig. 2 shows the altered position of the parts when producing ignition of the main burner and extinction of the pilot light. Fig. 3 shows the position of the parts during the temporary suspension of the alternating action. The chamber A has a concentric container B for the gas intercepting and buoyant medium, which may be mercury, vaseline, or the like. The bell or dome C is fitted to move freely in B, and carries an adjustable central stem D. The cover E renders the chamber dust-proof. In fig. 1, the mechanism is shown with the operative parts in their normal position to allow the gas which has entered through the supply pipe G to pass into the Chamber N, and out through the pilot outlet tube J communicating with the side tube K, and thence to the bye-pass chamber, which communicates with the burner. In this figure the bell C is in its lowest position.

Fig. 1.

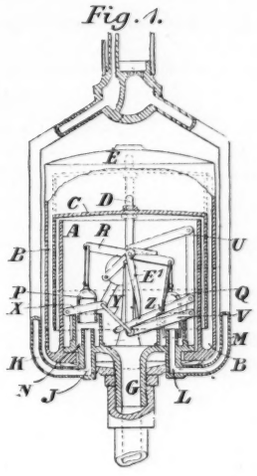


Fig. 2.

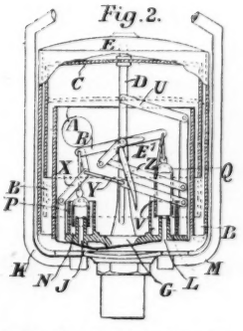
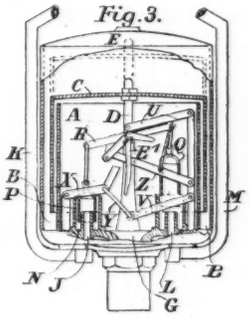


Fig. 3.



In fig. 2, the bell has been raised to its top position, and the associated operative parts have changed as shown. During the rising movement of the independent lever Z, the balance-lever R has been canted, by the connecting rod, in the opposite direction to that shown in fig. 1—thus closing the pilot pipe J and opening the burner outlet tube L communicating with the side tube M associated with the burner. The bells P and Q are so arranged in the relative lengths of their suspending rods that the complete cutting off of the gas from the chambers shall not be accomplished until ignition takes place either at the burner or at the pilot light.

In fig. 3, the mechanism is in a position consequent upon a reduction of pressure. The bell C has descended, and with it the parallel bars U and V, also the lever X with its connection Y attached to the cross-head of the central stem D. The pendulum E^1 has swung out of the centre, in the opposite direction to that shown in figs. 1 and 2, so that if the bell were again raised, the cross-head would exert a pressure on the side of the pendulum nearest to it, and, by forcing it against a stop of a looped lever, would cause it to release the lever Z, which would then fall back into the position shown in fig. 1, and the burner would be extinguished; but the pilot light would be prepared for re-lighting it when the bell C was again operated.

APPLICATIONS FOR LETTERS PATENT.

15,193.—Rudd, A., "Incandescent gas-lamps." July 24.
15,194.—Tully, C. B., "Manufacture of gas." July 24.
15,205.—Roessler, A. C., and the Air-Light Company, Ltd., "Automatic gas-lighting apparatus." July 24.
15,210.—Brady, C. P., "Testing water-pipes." July 24.
15,226.—Parry, J., and Pillinger, H. J., "Making coal gas." July 25.
15,230.—Parry, J., and Pillinger, H. J., "Indicating gas given off from stores of coal." July 25.
15,267.—Hill, E., jun., "Preventing unauthorized use of cocks or taps." July 25.
15,278.—Lake, H. H., "Gas reversing valves." A communication from H. E. Schild. July 25.
15,309.—West, J., "Conveyor chains." July 25.
15,317.—Weber, G., "Acetylene burners." July 25.
15,331.—Sim, A., "Acetylene generators." July 26.
15,343.—Redman, T., "Charging inclined retorts." July 26.
15,409.—M'Cormack, H. J., and Brennar, J., "Gas-tap." July 27.
15,413.—Rose, A., and Bellamy, W., "Inverted incandescent gas lights." July 27.
15,421.—Slading, J., "Anti-vibrator." July 27.
15,484.—Burrow, W. C., "Maintaining a constant pressure of air or gas." July 28.
15,540.—King, J., Jun., and Burnett, J. R., "Gas-heated furnaces." July 29.

The Directors of the Gas, Water, and General Investment Trust, Limited, have declared an interim dividend of 4½ per cent. per annum on the preferred stock for the six months ending the 28th ult.

LEGAL INTELLIGENCE.

BIRMINGHAM ASSIZES.—Monday, July 31.

(*Before Mr. Justice* DARLING *and a Special Jury.*)

New Conveyor Company, Limited, v. Gilbert Little.

An Action for the Return of Money Wrongfully Paid Away.

This was a case in which the New Conveyor Company, Limited, of Smethwick, sought to recover from Mr. Gilbert Little, their late Managing-Director, sums of £500 alleged to have been wrongfully paid to Mr. J. H. Sheldrake in connection with the purchase of patents belonging to the Automatic Coal-Gas Retort Company, and £63 said to have been spent in entertaining officials of corporations.

Mr. HUGO YOUNG, K.C., and Mr. DISTURNAL appeared for the plaintiffs; Mr. VACHELL, K.C., and Mr. PRITCHETT represented the defendant.

Mr. YOUNG, in opening the case, said it was admitted that the £500 was taken out of the banking account of the plaintiffs. The plaintiff Company was registered in 1889, with an issued capital of something like £25,000 in £1 shares. In June, 1889, an agreement was entered into by which Mr. Little was appointed Managing-Director. The defendant, who was to give the whole of his time, was to receive £840 a year, payable monthly. When the transactions in dispute took place, there were only two Directors—the defendant and Mr. Foster, now deceased. Much confidence was placed in Mr. Little; and many matters were left to him entirely. Defendant was authorized to draw cheques in his own name on the Company's account. Patents held by the Automatic Coal-Gas Retort Company were in the market in July, 1899; and the defendant felt that these patents might be usefully employed in the business of the New Conveyor Company. This was represented to the shareholders; and it was agreed, on certain terms, to purchase the Automatic Company's patents. Negotiations followed; and ultimately the purchase was completed. The negotiations were conducted entirely by Mr. Little. In the first instance, he offered £600; but this was refused—the Automatic Retort Company expressing their willingness to sell for £1000. This was accepted by Mr. Little on behalf of the New Conveyor Company, and the purchase completed. Then came the improper action of which the plaintiffs complained. At this time Mr. Little, having the power to draw cheques in his own name, asked the Secretary to give him a couple of blank cheques. This request was complied with; and Mr. Little filled in one for £1000, with which to pay for the patents. The other he filled in for £500, to his own order. The latter cheque was duly cashed by him, and he drew £500 from the bank; the amount, in notes, being paid over the counter. Later on, the sale having then been carried out, the audit of the accounts of the New Conveyor Company took place. In the balance-sheet there appeared an item: "Payments in respect of patents acquired, £1500." The Auditors added a note to the effect that they had audited the books and accounts of the Company, but that they had not been able to fully verify the amounts paid in respect of acquiring patents. At a meeting in October, 1900, the defendant stated that the £1000 had been paid in connection with the purchase, and that the £500 was distributed among the Directors of the Automatic Retort Company. Defendant intimated that it was what was sometimes called "greasing the wheels"—to make them go smoothly. The explanation was deemed unsatisfactory; and the shareholders insisted on another Director being appointed. Mr. G. Whitehouse was elected to the position; and he found matters very unsatisfactory. The defendant's son was Secretary of the Company; and the new Director was unable, owing to obstacles which were placed in his way, to thoroughly investigate the circumstances relating to the £500. Twelve months' notice was subsequently given to Mr. Little to terminate his engagement; and this notice expired in May of last year. In his statement of defence, Mr. Little said the negotiations leading to the sale of the patents at £1500 were made by himself and Mr. Foster; and that £1000 was paid to the Company, and £500 to Mr. Sheldrake, one of the Directors of the vendor Company. The cheque was signed and endorsed only by the defendant. If Mr. Little gave the £500 to Mr. Sheldrake, it was an illegal act, for he was giving a bribe equal to half the purchase money. It was a wholly unauthorized act, and could not stand in law. Mr. Sheldrake's account of the proceedings was that, when Mr. Little offered him £600 for the business, he said: "I shall give you £250." Mr. Sheldrake thought he was only joking; and the offer was not accepted. When the sale at £1000 was completed, Mr. Sheldrake stated that Mr. Little asked him to accompany him. He went to the bank and drew out the £500, saying to Mr. Sheldrake: "I am going to give you this." The money was paid; and then defendant wanted Mr. Sheldrake to invest it in some concerns which he named. Mr. Sheldrake said there had not been any stipulation of that sort. Counsel concluded by saying that it did not matter whether it was a pre-arranged bribe or a gift. Mr. Little had no right to make the gift; and if it were a bribe, it was illegal.

Evidence was given by Mr. *T. H. Pritchard*, a former Secretary of the New Conveyor Company, who stated in cross-examination that the defendant originally got together the business, and he established the Company. He was the biggest shareholder; and a large number of shares were held by members of his family.

Mr. VACHELL, for the defence, argued that the £500 paid was a commission to Mr. Sheldrake for introducing the vendors of the patents to the plaintiff Company. Mr. Little had acted with perfect fidelity to the Company; and the commission was paid solely in order that the patents might be acquired.

Defendant, who was then called, stated that when he first discussed the purchase of the patents with Mr. Sheldrake, the latter stipulated that he should have £500 for himself. He explained that an item of £65 claimed by the plaintiffs was spent in entertaining possible customers—officials of corporations.

Cross-examined by Mr. YOUNG, witness admitted that the patents were invalid, and that he wished the payment to Mr. Sheldrake to be kept secret. He supposed this would be called commission; it was given to Mr. Sheldrake to get the patents for him (defendant). Asked whether he knew it was illegal to pay a commission to the representative of a vendor company, witness replied that he was under the impression then that the Company were in liquidation.

Mr. YOUNG: So much the worse, then, because the shareholders wanted to get all they could. Did you know it was illegal to pay anything to anyone engaged in the sale of a business—in this case £500 out of a total paid of £1500?

Mr. VACHELL (interposing): Ask him if he believed it was illegal.

Mr. YOUNG: Did you believe it was illegal.

Witness: I did not know the law.

Did you regard it as a proper payment to make?—Yes, when I was getting hold of a very good patent.

To pay £500 on a purchase price of £1000?—Yes.

You would do the same thing again?—I do not know.

Mr. *J. H. Sheldrake*, having been asked by his Lordship whether he desired to give evidence, replied in the affirmative, and then entered the witness-box. In answer to his Lordship, he admitted that he received the £500 from Mr. Little in bank notes. He did not stipulate that he should have it. He did nothing for the money; and he regarded it as a present, which he was very pleased to receive.

Questioned by Mr. VACHELL, witness said that after having received the £1000 at the office of Messrs. Lumley and Lumley, he went with Mr. Little to a bank in Lombard Street, where the £500 was passed over the counter and subsequently handed to him. He did not in any way connect the receipt of the £500 with the completion of the sale of the patents. He regarded it as just a coincidence that they happened to be on the same day. He made no stipulation that the £500 was to be paid to him; but he had done a good thing for the Automatic Retort Company in connection with the transaction. In the first place Mr. Little called upon him about buying the patents. He agreed to give £600, which was to include the drawings and patents; and Mr. Little added: "I will give you £250 for yourself." Witness said he made no comment, as he had never received any commission of the kind before. He called together his Directors, whom he advised not to sell under £1000. It was resolved to sell at that figure; and he informed Mr. Little, who replied, "I will pay that, and I will give you £500 for yourself." That was the whole truth of the matter.

Mr. VACHELL; You did rather connect the £500 with the sale of these patents?

Witness: Yes, so far as it was given to me as a present afterwards.

His LORDSHIP; Did you tell the people for whom you were acting that you had received £500?

Witness: No; but they were pleased that I had sold at £1000.

Will you explain why Mr. Little should have given you £500 for yourself?—I cannot explain, unless he did his business extravagantly.

Mr. VACHELL asked the Jury to consider whether the circumstances of the transaction did not amount to this—that while Mr. Sheldrake knew his Company would sell for £1000, Mr. Little did not; and that the latter was willing, on behalf of his Company, to give £1000 and more. If he could get the patents at £1000, he was prepared, by way of commission, to give £500. If this were the way it was done—if the £500 were not part of the price, but merely a reward to Mr. Sheldrake for putting Mr. Little in possession of the patents at £1000—then surely it was not an illegal agreement. It was not, of course, a practice which they might admire. They were invited to say that the payment was practically a bribe, and that the money ought to have found its way into the pockets of the Automatic Retort Company. He urged that the payment was entirely in the nature of a reward or commission to Mr. Sheldrake for having enabled Mr. Little to make an advantageous purchase. Business of the present day had sometimes to be carried on by certain aids, the introduction of which was, of course, to be regretted. Palms had to be moistened; people had to be sweetened; and "wheels had to be greased." Mr. Little had tried to assist business in bad times by a way which was not altogether justifiable—by making straight the path towards orders. If he had done this in the Company's interest, he appealed to the Jury's better judgment that it would be unfair of the Company to turn round and ask for the return of those very moneys which he had expended on their behalf.

Mr. YOUNG pointed out to the Jury that, if a man were placed in full control of a business, he was not expected to do dishonest things. Assuming that there was a stipulation to the bargain that Mr. Sheldrake was to receive £500, it was obviously a matter which should have been brought before the Company; and when the defendant was asked questions, they should have been answered satisfactorily. Defendant had no authority whatever to part with the £500.

His LORDSHIP, in summing up, remarked that defendant, as Managing-Director of the Company, was bound to spend money only on the legitimate objects of the Company. He drew two cheques on the Company's banking account—one for £1000, and another for £500. There was no dispute as to the first amount. Defendant said the £500 was paid to Mr. Sheldrake—a fact which was admitted. He said it was part of the purchase money; but if that were so, it was very odd the money was not drawn in one cheque. The point that the Jury had to consider was whether the money was paid for the legitimate affairs of the Company. It was paid, defendant said, because Mr. Sheldrake had stipulated that he was to have it. Who was Mr. Sheldrake? He was a Director of the Company who were selling the patents. He was bound to act for the benefit of the shareholders. He was bound, if he could sell the patents for £1500, to put the whole of the money into the firm's banking account, so that the shareholders would get the benefit of it. Only £1000 went for the benefit of the shareholders; the other £500 went into Mr. Sheldrake's pocket. He (his Lordship) asked him what he had done for it; and he replied, "Nothing, it was a present." He did not like to call it a bribe; but what other name was there for it? Attempts had been made to call it a commission. How could it be so called? Fancy getting £500 as commission on the sale of a thing for £1000! What sort of commission! The commission would be payable in order to induce Mr. Sheldrake to part with the property of his own Company for less than it was worth! Could they call that a commission? The proper name, and the only name, for the transaction was a bribe. Could he have

put it down in the affairs of his own Company—"Mr. Sheldrake, commission received?" Of course not. He took it absolutely dishonestly, and against the interests of his own Company. There was nothing in any of the powers conferred upon Mr. Little which authorized him to spend the money of his Company in either giving a present of £500 or a bribe of that amount; and the thing was either one or the other. In neither case was there anything to justify him in giving it. Counsel had suggested that in these days it was necessary to "grease the wheels." But that, if correct, did not mean the right of giving away the property of a company. If it were a bribe, a bribe was an absolutely illegitimate thing; and there was nothing in the Articles of Association of the Company which authorized the giving or taking of bribes. How could Mr. Little possibly retain the £500? If it could be by any means, Mr. Vachell would have told them. He (the learned Judge) confessed that he saw no legal way by which Mr. Little could keep the money. Then there was the item of £63 which was said to have been spent in entertaining corporation officials. Defendant had rendered no account to those to whom the money belonged. He had no authority to do anything of the sort. How much he spent on himself and how much on corporation officials, they had no means of knowing. At the most, the defendant and his family never owned more than one-third of the shares of the Company. The smallest shareholder in a company had as much right to fair and honest treatment as the largest. It was not permissible for a man to say he could misapply £500 of a company's property because he had a large share in the company and was a director. He had no right to invite any kind of damage on other people. Defendant had no right to give Mr. Sheldrake £500 if one shilling came out of the pocket of anyone who had not authorized him to do it. Commercial morality was so much involved in the case that it would be interesting to see what the view of a Special Jury of Birmingham men was regarding this sort of transaction—whether it was to be given out to the world that directors and secretaries, if they happened to have a large holding in a company, could apply the company's money as they pleased (give it as presents or as bribes), and, when asked by shareholders to account for it, could say: "You have a small share; I have a large one. There is no justice for you. There is one law for the rich, and another for the poor; one law for the large shareholder, and one for the small."

The Jury at once returned a verdict for the plaintiffs for the full amount of the claim.

BIRMINGHAM ASSIZES.—July 31 and Aug. 1.

(*Before Mr. Justice* DARLING *and a Jury.*)

Eveson Coal and Coke Company v. Grassmoor Colliery Company.

Alleged Wrongful Employment.

This was a claim by the Eveson Coal and Coke Company against the Grassmoor Colliery Company for wrongful employment. The case for the plaintiffs was that by an agreement in writing made on Sept. 1, 1897, Mr. Thomas Cash, their traveller, was to give his whole time to their service, at a salary of £850 per annum, for a term of seven years. His duty was to sell coal to gas companies and others, and to go to collieries and purchase coal to meet the orders obtained. Mr. Cash was brought into contact not only with the large consumers, but also with the colliery proprietors from whose pits the supplies were drawn. Notwithstanding the terms of Mr. Cash's agreement (which it was said that the defendants knew), they, it was alleged, persuaded him to seek business on their behalf. It was asserted that while Mr. Cash was receiving his salary from the plaintiffs, he went about, at their expense, nominally acting for them, but really doing business in his own name for the defendants. The defendants denied the allegations. They said they did not know of the agreement, and affirmed that they had not induced Mr. Cash to seek orders from the plaintiffs' customers or from anyone else.

After evidence had been given for the plaintiffs, Mr. Shearman, K.C., who appeared for the defendants, submitted that there was no case to go to the Jury. There was no evidence, he urged, that Mr. George Leach (the Secretary and Manager of the Grassmoor Colliery Company) used any malicious inducement on behalf of the defendants. What they had done was not entering into contracts which were a breach of Mr. Cash's duty. They had merely entered into contracts which enabled him to fulfil contracts which were in breach of his duty; and they were contracts with gas companies. As to the question of conspiracy with Mr. Cash, there was no evidence whatever. His Lordship remarked that, so long as the Court of Appeal held its present views, he should always leave such cases to the Jury. Mr. Shearman then addressed the Jury, pointing out that if they came to the conclusion that the defendants were not aware of the existence of the contract, the action fell to the ground. If they did not, then it must be proved that Mr. Cash was induced by the defendants to break the contract for their own benefit. He pointed out that it was quite a common thing on the Birmingham Exchange for a broker to represent one person one day and another person another. Mr. Cash's wrong was that he had entered into contracts with certain gas companies; and all that the plaintiffs had done was to supply him with coal on the ordinary market at the ordinary market prices.

The first witness called for the defence was Mr. Leach, who said he was unaware of the existence of the agreement. There was nothing unusual on the Birmingham Exchange in one man representing more than one firm. He did not give instructions for Mr. Cash's name to be kept out of the books. Mr. Cash had never paid him any commission, and he had not received a farthing out of the transactions as distinct from the firm. In reply to Mr. Hugo Young, K.C., who represented the plaintiffs, witness said he had known several cases in which a traveller represented more than one firm in competition with others. Mr. Young: Do you mean to say it is usual for one traveller to represent more than one firm in competition with others?—Witness: I have known several cases. Mr. Young: Do you mean to suggest it is usual? Witness: I have known several cases. Mr. Young: Is it usual?—Witness: I cannot go beyond that. Mr. Young: Do you really wish to represent that it would be consistent with a man's duty (like Mr. Cash) to represent his own Company and also to represent another Company in a matter of this kind?—Witness: Well, I don't know; it would be according to what the arrangement was.

Other witnesses were also examined. Mr. E. E. Barnes, one of the Directors of the defendant Company, said that he had no reason to suspect that Mr. Cash was otherwise than an honest man. From first to last nothing came to their notice which was calculated to arouse suspicion. Mr. A. G. Barnes, another Director, said they were unaware of any contract binding Mr. Cash not to deal with them. The transactions with Mr. Cash were arranged by Mr. Leach. Mr. J. Norman, Office Manager to the defendants, produced the books, and said that no instructions were given to conceal Mr. Cash's name. He denied that certain pencil entries in the books were made since the commencement of the action.

His Lordship, in summing up, said it must be proved that the defendants knew of the contract before a charge could be brought against them of persuading and procuring Mr. Cash to break his contract. Where was the evidence that the defendants knew anything of the kind? The only person questioned—Mr. Leach—said that he did not know anything about it. Was it right to bring a respectable firm to the Assizes, and charge them with inducing and procuring Mr. Cash to solicit orders for them, and pay him commission for doing it, when the plaintiffs had not one atom of evidence that defendants did anything of the sort; and when they did not dare—he used the word advisedly—when they got the defendants into the box, to suggest that they did do anything of the sort? As to the question of conspiracy, he pointed out that the defendants could not conspire to break an agreement unless they knew of its existence.

The Jury found for the defendants, and judgment was entered accordingly.

Eveson Coal and Coke Company v. Spooner.

Alleged Wrongful Employment.

This action was down for hearing on the following day—Wednesday, Aug. 2—but Mr. Stanger, K.C., announced that it had been settled; the parties agreeing to a verdict for the defendant, with costs.

The Water Board and the Charge for Baths.

At the Westminster County Court last Tuesday, the Metropolitan Water Board sued Mrs. Hawkins, the owner of 28 houses at Wimbledon, for a year's water-rates, and, in addition, sought to recover in respect of each house 10s. per annum for a bath supply. Mr. Shaw appeared for the Board. Mr. George Kebbell, who represented the defendant, submitted that, upon the construction of the Lambeth Water Acts, the Board could recover nothing for a bath supply, and further that, seeing the entire rate for the domestic supply was only 21s. a year, 10s. was an unconscionable charge for a bath. His Honour held that the Board were not entitled to be paid for baths, and disallowed that part of their claim; and he further reduced it by deducting so much per week in respect of the time during which certain of the tenements were proved to have been empty.

Fatal Accident at the Market Drayton Gas-Works.—An inquiry was held last week into the death of a man who for the past six months had been employed as a stoker at the Market Drayton Gas-Works, and who sustained injuries (which ultimately proved fatal) while clearing out the refuse and clinkers from the retort-furnace. When doing this work he should have used an additional set of bars, so that the fire could be supported while the ordinary bars were removed for cleaning. Apparently, however, he failed to adjust the duplicate bars properly, with the result that a portion of the fuel fell into the water underneath, and deceased was scalded so badly that he died a few days later. The Jury returned a verdict of "Accidental death from scalding," and suggested that stone or brick steps should be substituted for the present iron ones approaching the furnace-pit.

New Joint-Stock Companies.—The Kincardine-on-Forth and District Gas Company, Limited, has been registered with a capital of £3000, in £5 shares, to acquire the gas-works at Kincardine-on-Forth, Fifeshire; to light with gas or other illuminant the town and neighbourhood; and to carry on the business of a gas, coal, and coke company. There will be no initial public issue. The United Wholesale Incandescent Gas Company, Limited, has been registered with a capital of £1000, in £1 shares, to carry on the business of importers and exporters of incandescent mantles, burners, and all accessories for incandescent light, and to adopt an agreement between P. Hossfeld and the Wholesale Incandescent Company, Limited. There will be no initial public issue. The Voelker Lighting Corporation, Limited, has been registered with a capital of £37,500, in 5s. shares, to adopt an agreement with the Voelker Incandescent Mantle, Limited, to acquire patents and inventions relating to gas mantles and burners, and to carry on the business of manufacturers of, and dealers in, gas mantles, burners, fittings, and appliances. There will be no initial public issue. A Company has been formed, under the title of Forbes, Abbott, and Lennard, Limited, with a capital of £100,000, in £1 shares (3635 preference), to acquire the business of Messrs. Forbes, Abbott, and Lennard, Limited (incorporated in 1896), to adopt an agreement between the old Company, Mr. J. A. Fletcher (as Trustee for this Company), Mr. J. Abbott, Mr. J. Forbes, and Mr. F. Lennard, and to carry on the business of chemical manufacturers and merchants, distillers, gas and coke manufacturers, manufacturers of bricks, tiles, and similar goods, &c. There will be no initial public issue.

MISCELLANEOUS NEWS.

SULPHATE OF AMMONIA COMMITTEE'S REPORT.

As mentioned in "Notes from Scotland" last week, the annual meeting of the subscribers to the Sulphate of Ammonia Committee was held on this occasion in Edinburgh, at the offices of the Edinburgh and Leith Corporations' Gas Commissioners. The report presented by the Executive Committee, and signed by the Chairman (Mr. W. G. Blagden), contained the following paragraphs.

During the season of 1904, which was a good one for crops generally, 107 competitions for the Committee's prizes were organized by Agricultural Societies, &c., throughout the United Kingdom. As in previous years, however, a few of these were for various reasons abandoned—chiefly through lack of sufficient entries; and 98 out of the total number were finally completed. It may be stated that in 1904 the Committee thought it desirable to increase the minimum number of entries for their competitions—a course which has been justified by the fact that the number abandoned in that year was smaller than in the preceding year.

These competitions, together with the cattle feeding and other trials which are dealt with in a preliminary report of the Committee's Technical Adviser, have all proved highly satisfactory, and confirm in every respect the claims previously made by the Committee of the benefits derivable from the judicious use of sulphate of ammonia.

The full report on the 1903 competitions and experiments, with complete tabulations appended, was duly issued and circulated throughout the kingdom.

As in previous years, sulphate of ammonia was advertised during the continuance of the manure season in the chief agricultural papers and periodicals.

Renewed efforts to increase the membership have been made, and have been attended by a considerable measure of success; the Committee being able to report substantial additions both to the number of subscribers and to the tonnage. During the year, 31 new members have joined, including the proprietors of several important iron-works and coke-oven plants. The quantity of sulphate of ammonia represented by the subscriptions in the past year shows an increase over the previous year of nearly 10,000 tons; the actual figures for the two periods being as follows:—

	Tons.
July, 1903, to June, 1904, inclusive	128,550
July, 1904, to June, 1905, inclusive	138,221
Increase	9,671

In consequence partly of this increased tonnage, and also of the cessation during the year under review of any outlay on account of exhibitions, the Committee were able to reduce the amount of subscription from 5d. to 4d. per ton.

Although there are indications that the great advance which has taken place in the price of sulphate of ammonia has had the effect of somewhat retarding the increase in its consumption in this country, it is felt that this feature is of quite a temporary nature, and that the British farmer who now hesitates to pay current prices will sooner or later have the fact brought home to him that sulphate of ammonia is still the cheapest and best form of nitrogen, the judicious application of which must amply repay him.

IRONMONGERY AND HARDWARE EXHIBITION.

The Incandescent Gas Lighting Exhibits.

The Sixth Annual International Ironmongery, Hardware, and Allied Trades Exhibition, which was open at the Agricultural Hall, Islington, from the 25th ult. till last Friday, afforded the makers of incandescent gas lighting appliances a good opportunity for bringing under the notice of the tradespeople more immediately interested in the exhibition the latest appliances designed for use with the incandescent system of gas lighting.

Taking the exhibitors in their alphabetical order, the Air Light Company, Limited, had a good show of high-pressure gas factory, indoor and outdoor suspension and enclosed dust-proof lamps, to demonstrate how the Company's system can be applied without interference with the gas service. The Bloch Light Company—the English branch of an American concern formed to work the patents taken out for the light after which it is named—had some good samples of their specialities. The feature of the burner is an adjuster of the gas-inlet, by means of which the supply of gas is regulated so as to give the maximum of light with the minimum of consumption. The Company also showed the mantles they supply for use with the burner, for which great brilliancy and economy in use are claimed as the result of the above-named arrangement. At the stand of Messrs. George Bray and Co. there was a fine show of incandescent gas lighting specialities, in addition, of course, to a large assortment of the flat-flame burners, including the "Special," with which their name has for the last forty years been associated. A feature in the incandescent section was the firm's inverted burner, which can be readily applied to any existing gas-fitting without the use of a special adapter. Another feature of the exhibit was a collection of burners suitable for acetylene. For their "Elta" burners the firm make the claim that they remove one of the greatest barriers to the progress of acetylene lighting—viz., the deposit of carbon on the tips when the flame is turned low. The Buhlmann Incandescent Syndicate, Limited, had a good show of their mantles, the characteristic features of which have been fully indicated in our columns. The General Heating and Lighting Company, Limited, showed Moeller's single and double mantle burners (the latter with central draught), inverted burners of their new pattern, indoor and outdoor lanterns fitted with high-pressure burners giving 150 to 1000 candle power, high-pressure "arc" lanterns, and gas-compressing apparatus. The Instantfix Incandescent Gas-Burner Company showed their special burner, which can be put on an ordinary flat-flame nipple, thus converting it into an incandescent burner. Messrs. Nehemias Lee and Co. had on view their "Noshado" incandescent gas-burner, which is constructed to allow the light to pass vertically, without any diminution of that given off in other directions. Moffat's, Limited, had a representative selection of their well-known Lucas lamps, in powers ranging from 200 to 2000 candles per lamp. A novelty introduced by the firm in connection with their "K" burner is the Sydney lamp, consisting of a cluster of three inverted burners, giving 240-candle power, and suitable for either indoor or outdoor lighting. At the Company's stand was to be seen an attractive display of special mantles, globes, and fittings. Messrs. A. E. Podmore and Co. made a good show with their high-power lamps, fitted with single and grouped burners, suitable for entrance halls, shops, mills, workshops, and business places generally. The burners being dust-proof, these lamps are specially adapted for lighting weaving-sheds and flour and saw mills. A light was shown fitted with an automatic switch for ignition from a distance. A feature of the collection was the firm's reversible globe, adapted either for arc lighting or for domestic use. This is a new departure in globes, being half opaque and half plain. Its usual position is with the opaque portion downwards; and it is claimed that this is advantageous in several ways. When used for schools, for example, the scholars' eyes are screened, while the clear glass allows maps or the blackboard to be well lighted. At the stand of the United Kingdom Lighting Trust, Limited, was to be seen, in the company of their patent reflectors, by the use of which they claim that an increase of 43 to 105 per cent. in light may be obtained, their "Black Diamond" indestructible mantle, which appears to be capable of giving very good results in use. It is made in two sizes. The exhibit of the Voelker Incandescent Mantle, Limited, not only enabled visitors to see their mantles, but also, as at the Earl's Court Exhibition, the process of producing them. A model of their inverted burner was on view, as also a specimen of the Bellamy lantern for street use, and various types of lamps for both interior and outside lighting. The Wright and Butler Manufacturing Company, Limited, had a very fine stand, on which they showed the "Darwin" inverted gas-light in several varieties, incandescent burners, gas cooking-stoves, petroleum lamps, &c. The principal novelty was a hot-water boiler capable of attachment to any gas-stove. The firm's "Paragon" combined cooking-stove and bath-heater was also on view.

As automatic lighting has become an auxiliary of the incandescent gas system, mention must be made of the stand of the Pneumatic Gas Lighting Company, Limited, whose lighter is operated by air pressure actuated by a switch. Since the appliance was exhibited at Earl's Court, when it was described and illustrated in the "JOURNAL," it has, we learn, undergone great improvement. By its means consumers can now switch on gas with the same facility as with the electric light.

Apart from lighting, one of the most effective displays was made by the Flavel Range and Imperial Gas-Stoves, Limited, of Leamington. Gas cooking and heating stoves, hot-plates, restaurant grillers, portable washing boilers, &c., in great variety, were on view. The Company also showed their patent hot-water apparatus, the "Cyclone," by means of which a supply of hot water can be obtained by utilizing the waste heat from gas-cookers.

GLASGOW CORPORATION GAS ACCOUNTS.

The Glasgow Corporation gas accounts are not yet available for the full notice which it is our custom to publish; but we learn from last Wednesday's "Glasgow Herald" that for the year ending May 31 the gross revenue was £800,177, and the gross expenditure £652,606, to which is added depreciation written off capital assets £36,199, making a total of £688,805; the balance carried to profit and loss account being £111,371. The Committee had to meet the following requirements during the year: Annuities on stock, so far as unredeemed or unconverted, £23,084; contribution to Corporation loan funds in respect of 3 per cent. Corporation stock, redeemable in 1921, issued in lieu of converted gas annuities, £8261; interest on borrowed money and redeemed loans, &c., £60,348; and sinking fund, £31,734—a total of £123,427; leaving a deficit on the year's operations of £12,055. The credit balance carried forward from the previous year amounted to £33,081, from which has to be deducted the deficit, leaving to be carried to the credit of next year's account £21,025. The market for residuals has been unfavourable, the average price received per ton of coal carbonized being 3s. 5·075d., as compared with 3s. 9·835d. for the previous year. The amount added to the sinking fund during the year was £44,907. The sinking fund, with its accumulations, now stands at £547,497, of which there has been already applied, in the redemption of borrowed money, 3 per cent. stock and annuities £517,925; leaving still available for those purposes £29,572. The net expenditure on works and plant during the year was £135,351; making the total outlay £2,456,582. Deducting from this sum depreciation written off works, plant, and premium account during the year, amounting to £36,200, leaves the amount expended on works and plant at May 31 as £2,420,382. The amount borrowed during the year for capital purposes was £25,000. In accordance with the recommendation contained in last year's report by the Gas Committee, the Corporation made application for a Provisional Order authorizing, *inter alia*, the borrowing of an additional £1,000,000 in order to meet capital expenditure in completing the first section of the Provan Gas-Works and the erection and equipment of the second section, together with other new work in progress or in contemplation. The Committee recommend that the price to be charged for gas for the current year be continued at 2s. 1d. per 1000 cubic feet for lighting and domestic purposes, but reduced from 2s. to 1s. 9d. for motive power, and from 2s. 1d. to 1s. 9d. for manufacturing purposes; the charge in the Milngavie area of supply being in each case 1s. per 1000 cubic feet above these rates.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held on Friday, at the Offices, Horseferry Road, Westminster—Mr. Howard Charles Ward (the Deputy-Governor) in the chair.

The Secretary (Mr. H. Rayner) read the notice convening the meeting; and the seal of the Company was affixed to the Register of Proprietors. The report, which, with the accounts, was given last week, was taken as read.

THE GOVERNOR'S ABSENCE.

The Chairman: Gentlemen, before I enter into the business of the meeting, I am sure the proprietors generally will feel regret at the absence of the Governor (Sir William Makins, Bart.). I am sorry to say he is suffering from severe illness; and, though he is very desirous of meeting the shareholders, as he always has been, still he is forbidden by his medical attendants from exposing himself to any sort of physical trouble. He has been under the care of doctors for the last five weeks; and, though he is daily gaining strength, he is still very weak. This is the first occasion since the Governor has been a Director that he has been away from any half-yearly meeting of the Company. I need not say how much his brother Directors regret his absence to-day; and I am sure the proprietors will regret it also. Now, gentlemen, I have had a letter from the Governor, and I will read it to you. He says: "My dear Ward,—I am sending you the notes of my speech which I had hoped to have delivered on Friday; but my doctor decides that, although I am improving steadily, I am not fit for the exertion of attending the meeting. I am sorry to write this, as it will be the first half-yearly meeting from which I have been absent since I became Governor in 1883"—that is a long time ago—"or indeed since I joined the Board in 1872." That is a very long record, which speaks very well for both his health and his devotion to the interests and business of the Company. Then, he goes on to say: "If you see no objection, I should be glad if you would allow the notes to be read to the meeting after you have made your own speech, as it will preserve the continuity of the statements I have made half-yearly for some time past. I leave it entirely to you whether or not they should be read; but I shall be glad if you so decide." Now, the Governor has always prepared with very great care the speech that he has delivered to the proprietors, and he has done so on the present occasion. I have his notes here; they are thoroughly exhaustive, and deal with everything, I believe, which can arise at this meeting on the proceedings of the Company during the past half year; and I think my best plan is not to take up your time by going over the ground twice, but to submit the speech the Governor has prepared.

The General Manager (Mr. D. Milne Watson) then read

THE GOVERNOR'S NOTES ON THE COMPANY'S POSITION.

In dealing with the accounts for the half year, your attention is first called to the capital account, where the net expenditure amounts to £50,764. You will see that once again there has been no capital outlay on manufacturing plant, and that the expenditure under this head has been entirely in respect of mains, service-pipes, meters, and stoves. This latter expenditure has been rendered necessary by the addition to the number of automatic meter consumers, who during the half year have increased by over 14,000, and also by an increase of 15,000 in the number of stoves sold and on hire. Turning now to the revenue account, the result of the half-year's working shows a considerable falling off from that obtained in the corresponding half year of 1904. Comparing the two half years, there is a total reduction in income of £158,000; and, instead of having a surplus of £98,000 after paying the dividend as in the corresponding half of 1904, there is now a deficit of £30,000. This decrease is largely due to the serious fall in the price of residuals. As was pointed out in August last year, the circumstances then were altogether exceptional; inasmuch as coal was cheap and residuals were fetching good prices. The decline in revenue was further due to the reduction of 1d. in the price of gas, and the decrease in the gas sales of 1·8 per cent. Dealing first with residuals, if you will turn to the revenue account, you will see that under this head the receipts were £90,000 less; £72,000 of this decrease being due to the falling off in the receipts from coke. This is accounted for largely by the depressed condition of many important trades. The reduction in the price of gas of 1d. per 1000 cubic feet means a reduced income for the half year of £43,000; but the Directors are satisfied that the policy they adopted in July of last year has been justified, since there is no doubt that the reduction in price has been the means of retaining many consumers who would otherwise have given up the use of gas. There never was a time when competition was so fierce, and when prices for electric current were so low, especially those charged by borough councils who have their own electric undertakings, and who have the rates on which to fall back if they lose money. A penny per 1000 cubic feet may seem a small matter to a small consumer; but on large accounts it represents a substantial sum. The decrease of 1·8 per cent. in the quantity of gas sold is disappointing; but it must be borne in mind that the half year under review contains a day less than the corresponding half year, inasmuch as 1904 was a leap-year. It is satisfactory to report that during the half year under review there have been considerable savings in several directions. Coal and oil cost the Company £36,000 less than in the corresponding half year; and it is encouraging that the manufacturing wages show a reduction of over £8000—the result being that the wages per 1000 cubic feet of gas sold are the lowest on record for the Company. There is also a substantial saving of upwards of £6000 in purification; and distribution and wear and tear cost the Company nearly £8000 less than in the corresponding half of 1904. Rates and taxes, however, show, as usual, an increase; and there has also been an increase in bad debts, which, I fear, only too accurately reflects the state of trade in this country.

RESULT OF THE HALF-YEAR'S WORKING—THE DIVIDEND.

The net result of the half-year's working has been that, after providing for fixed charges, there is a profit of £314,127. To this has to be added the amount brought forward from the previous half year—viz., £248,192. The balance available for distribution, therefore, amounts to £562,319, out of which the Directors recommend, after setting aside £10,000 to the redemption fund, a dividend at the rate of £4 8s. per cent. per annum; thus leaving £217,408 to be carried forward to the credit of the current half year. In view of the fact that the dividend of £4 8s. per cent. per annum has not been quite earned, the Directors do not see their way to recommend that the present rate be increased to the full statutory rate of £4 10s. 8d.; and they feel sure that this policy will recommend itself to those proprietors who wish to see the Company's business in a sound position. As was pointed out at the half-yearly meeting in August, 1903, and again in February, 1904, it is a matter of importance to avoid frequent fluctuations in the dividend, as well as in the price of gas; and, therefore, in recommending the maintenance of a dividend at the rate of £4 8s. per cent. per annum, which has been the rate for the past five half years, it is felt that the Directors are only carrying out a policy which has been already fully explained to, and approved by, the proprietors. There is no doubt that in due course the proprietors will reap the benefit of a policy of reducing the price of gas, which enables the Company to meet competition and so build up the business, the ultimate result of which will be a financial gain to the proprietors.

THE REDEMPTION AND OTHER FUNDS.

Before leaving the accounts, there are one or two further items to which your attention should be drawn. This is the first half year in which the effect of the working of the redemption fund created by the Company's Act of 1903 is fully shown in the accounts, both as regards capital and dividend. It will be seen from the capital account (No. 3) that £19,965 of ordinary stock has been cancelled. The difference between this figure and the £20,000 authorized to be set aside is due to the expenses incurred in purchasing the stock. The effect on the dividend will be seen in Account No. 6, where it will be observed that, with the dividend at the same rate, there has been a saving of £439 in the half year. The superannuation fund, which was referred to at the last half-yearly meeting, has now been in operation during the past six months; and it is satisfactory to be able to say that, so far, it has worked very smoothly. It will be observed that the item on the debit side of the revenue account, under the head of "annuities," has been increased by £4000, due principally to the Company's subscriptions to the fund. It was pointed out in February last that the establishment of a fund would at first have this effect, but that after a few years the charge to the Company under this head would be gradually reduced. There is one exceptional item in the accounts, to which some reference should be made. The insurance fund account (No. 9) shows a payment of £8000 on account of claims arising out of the explosion of gas in Southampton Row, Holborn, in December last. The circumstances of this explosion were fully reported in the daily newspapers at the time. I am sorry to say that a number of people received personal injuries (although, fortunately, there was no loss of life); and, in addition, there was considerable damage to property. The Directors are pleased to report that nearly every claim for compensation has now been settled. The proprietors will admit, considering the area of the Company's district, and the magnitude of the work of supplying gas therein, that the immunity from serious accident is remarkable, and reflects great credit on the departments responsible for the work. The insurance fund exists for the purpose of meeting extraordinary claims arising out of exceptional circumstances, and the Directors, with the assent of the Government Auditor, have therefore no hesitation in charging the fund with the costs of the explosion, so that the revenue for the past half year in no way suffers.

THE RESTORATION OF GAS IN THE CITY.

The proprietors will no doubt have seen the announcement in the newspapers that the Corporation of the City of London have decided to discontinue electric arc lighting in Queen Victoria Street, Queen Street, Lower Thames Street, and Fleet Street, which are among the most important thoroughfares in the City; and to instal in its place, experimentally, gas lighting on the high and ordinary pressure systems. This is extremely satisfactory, not only as it will tend to increase the Company's gas sales, but as showing that the most important Corporation in the world realize that gas is a cheaper and better light for the streets than electricity. In this connection, I may mention that the number of public lights has increased by upwards of 700 in the half year, and that the great majority of the public lamps are now fitted with incandescent burners. The only instances in which any considerable number of flat-flame burners remain in use are in the case of one or two of the boroughs where the councils have electrical undertakings of their own. Another source of congratulation for the Company is the fact that they have secured the lighting of the new Victoria Station, in competition with electric lighting at an extremely low figure. Some time ago this Company persuaded the railway authorities to substitute gas for electric arc lighting in Victoria Station, as we maintained that by so doing they would obtain a better light and effect considerable economy. After a trial of twelve months, the Railway Company informed this Company that they considered the gas lighting in every way satisfactory, and that they had made a greater saving than had been estimated. This was in the old station; and now they have decided to light the new station with gas, which I am sure you will all agree with me is most satisfactory.

THE COMPANY'S PROSPECTS.

Then with regard to the future business of the Company. The accounts which we have been considering show that the deficit, after paying the dividend, was due chiefly to the state of the residuals market, which has been very depressed; and it cannot be said that there seems to be

any prospect of an immediate improvement in this direction. On the other hand, the Company have been able to buy their coal for the coming twelve months at slightly lower prices; and we must hope that the general trade of the country will soon show an improvement, in which case we may look with confidence to better prices for residuals.

THE LONDON GAS BILL.

These remarks as to the prospects of the Company bring me to another important subject—namely, the London Gas Bill, which is now awaiting the Royal Assent. It will be remembered that, at the half-yearly meeting in February last, it was announced that the three Metropolitan Gas Companies jointly—*i.e.*, this Company, the South Metropolitan Company, and the Commercial Company—and the London County Council had promoted Bills for the purpose of giving general effect to the recommendations of the Departmental Committee of the Board of Trade on Gas Testing in the Metropolis. The Companies had two chief objections to the London County Council Bill—namely, the test prescribed for illuminating power and the clause providing for the reduction of the standard price of gas by 1d. per 1000 cubic feet, which would have involved the reduction of the standard dividend by 2s. 8d. per cent. per annum. The London County Council ultimately agreed to withdraw this latter provision; and the Commons Committee decided that the London County Council Bill, as amended, should go forward, retaining the test for illuminating power, to which the Companies could not agree. The Committee, however, added one important provision —namely, that the illuminating power should be tested for penalty purposes on the average of three days', instead of one day's, results. On the Bill reaching the House of Lords, the Companies determined, after consultation, to continue their opposition, in order, if possible, that the proposed test for illuminating power should be altered. This action of the Companies was fully justified, as the House of Lords Committee, after hearing evidence—and especially that of Mr. Vernon Harcourt, one of the Gas Referees—decided that the test recommended by the Departmental Committee was not the best, and that the gas should continue to be tested as at present. To this the London County Council objected so strongly that they threatened to withdraw the Bill. It was, however, agreed to adjourn the Committee and give the London County Council and the Companies an opportunity of arriving at a compromise. After prolonged negotiations, a clause was agreed, which, while conceding to the Council their point—viz., that the test for illuminating power should be made at the 5 cubic feet per hour rate —provided that each Company's gas should be tested in the burner most suitable for obtaining the greatest amount of light. This to a great extent removed the difficulty felt by the Companies as to gases of different illuminating power being tested at the same rate in the same burner. The Lords Committee further confirmed the three days' average test for illuminating power, but in a slightly amended form. The abolition of the penalties in connection with sulphur testing, for which the Bill provides, and the modification of the restrictions as to sulphuretted hydrogen testing, while not in any way damaging the consumers' interests, will afford to the Companies considerable relief from regulations which caused them unnecessary anxiety. Though the Bill does not come into operation until Jan. 1 next, the London County Council have considerately agreed to allow the altered sulphur regulations to take effect as from Oct. 1 next. It is a pleasure to be able to put on record that, in connection with this and other Bills, the three Metropolitan Gas Companies throughout have been able to act loyally together, even though their interests were not at all times absolutely identical.

THE COUNTY COUNCIL AND HOUSE WIRING.

The London County Council attempted, in their General Powers Bill, to obtain practically unrestricted powers for Metropolitan Boroughs to wire houses for electricity, and to instal electric plant and fittings without any limitation as to cost. This would have been particularly hard upon the Gas Companies, inasmuch as had there been any loss (a thing not unknown in municipal electrical undertakings) these Companies, as large ratepayers, would have had to bear their proportion of the loss. The Metropolitan Gas Companies opposed the Bill jointly, and succeeded, in the House of Commons Committee, in getting a protective clause inserted, so that the cost of the work could not come upon the rates. When, however, the Bill came before a Committee of the House of Lords, their Lordships struck out the fittings clauses altogether.

THE BURDEN OF THE RATES.

Mention was made earlier of the growing burden of rates. This is a matter the Company are seriously taking up at the present time, as the quinquennial revaluation of the Metropolis is now being made; and no effort will be spared by the Company to obtain relief from this incubus, which is so fettering to the operations of the Company. I now beg to move:—"That this meeting do agree with, and confirm, the report of the Directors and the Auditors' report and statement of the accounts of the Company, as transmitted to the proprietors on the 27th ult."

Mr. U. J. BURKE: I beg to second that.

A SHAREHOLDER asked whether all the claims in connection with the accident in Southampton Row had been settled, or whether any of them were still dangling in the Law Courts?

The CHAIRMAN said he was happy to inform them that there was nothing "dangling in the Law Courts." Nearly all the claims had been settled. The payments amounted to upwards of £9000 altogether.

Mr. C. E. JONES said he was perfectly certain that the feeling of the proprietors was one of deep regret at the absence of the Governor from the meeting, as his eloquence illuminated with iridescence every subject that he chose to debate; and, with very great deference to the Board, he thought the shareholders, much to their regret, had lost some of this eloquence that morning. He did not say this complainingly; and, he was sure he but echoed the feeling of every proprietor in wishing the Governor a speedy recovery from his illness, so that he might be able to continue that useful life which had hitherto distinguished him. (Hear, hear.) To say that the report and statement of accounts were highly satisfactory, would be begging the question; but he had no doubt they were the best the Board had been able to produce, and he was not going to make any cavilling complaints about them. That the gas industry had passed through a critical time during last year was apparent to anyone who had taken the trouble to read this report. The dividend was the same; and he did not see that there was any immediate prospect of improvement. The gas industry, like every other industry, was subject to the vicissitudes of trade; and unquestionably this was a matter that had to be met. The question was, had it been met in the best possible way? He congratulated the Company, and the other Metropolitan Companies, upon their success in Parliament; and he particularly congratulated this Company on having regained the confidence of Parliament, which some years ago they had evidently lost. They had now succeeded (and he hoped the matter would be pushed to a final issue) in abolishing to a large extent, at any rate, some obsolete, retrogressive, and harassing legislation to which Parliament in its wisdom had thought fit most unjustly to subject the gas industry. He had no doubt the shareholders, and the gas industry throughout the world, would rejoice that the steps which had been taken had been successful in getting rid of one of the most unfair and unjust systems of legislation which ever existed. It was in restraint of trade; and from the time of Oliver Cromwell they had always encouraged trade and discouraged anything in restraint of it. He congratulated the Board most sincerely upon the success which they had achieved in this direction; and he hoped they would go forward, and succeed in entirely removing the pettifogging restrictions about testing for illuminating power. What was wanted was heat, not illumination; and the thing most thought of was the price. Coal at the present time was at the lowest possible price; and this was a contingency which in the near future would have to be faced, for he felt confident that the old days of cheap coal had passed away.

Mr. BAILEY asked whether the item "Automatic meter supplies (balance of fittings account)" which, in June, 1904, stood at £104,075, and in the present accounts at £77,394, had been reduced at the cost of revenue.

The CHAIRMAN replied in the affirmative.

THE BENEFICIAL EFFECTS OF UNITED ACTION.

Sir GEORGE LIVESEY expressed his deep regret at the absence of Sir William Makins from the meeting, more particularly on account of its cause. He was sure he was expressing the sentiment of everyone when he said they sympathized with the Governor in his illness, and wished him a speedy recovery. As reference had been made to the success achieved in the present session of Parliament through the union of the three Companies, he might be permitted to say that this success was largely due to the fact that the Companies spoke with one voice. Their co-operation was largely due to the efforts of the Governor and Mr. Watson, the General Manager. He hoped they would always continue to act in this way, believing that if they did they might look forward to getting justice again.

THE FINAL RESOLUTIONS—SALE OF PROPERTY.

The resolution was then put and carried unanimously, as was also one to sanction setting aside the sum of £10,000 out of the divisible profits for the redemption fund, in accordance with the provisions of the Act of 1903, and for the payment of the dividend as recommended in the report. A further resolution empowered the Directors to dispose of such portions of the Company's property as were not now required for the purposes of the undertaking. The principal sale was that relating to the Company's wharf premises in Millbank Street, Westminister, which are being acquired by the London County Council under compulsory powers conferred upon them by an Act passed in 1900, authorizing the carrying out of sundry improvement works in the City of Westminster.

Mr. BAILEY asked whether the proceeds of the sale of this property would go into the capital account.

The CHAIRMAN: Certainly they will.

VOTES OF THANKS.

Mr. BAILEY proposed a hearty vote of thanks to the Directors for their services during the past half year. He said he had no doubt that, under very trying circumstances, they had done their best, and the shareholders thanked them for what they had done.

Mr. PAGE seconded the motion, which was carried unanimously.

The CHAIRMAN said the Directors were most grateful to the shareholders for this kind recognition of their services. He could assure them, that both in their own interest and that of the proprietors, they had done their very best to promote the interests of the Company; and they would continue to do so.

The proceedings then terminated.

How Assessments are Settled.—Speaking at the half-yearly meeting of the South-Eastern Railway Company on Monday last week, Mr. H. Cosmo Bonsor referred to the increased rating, and expressed regret that the rates were £3400 more, principally in Kent and Surrey, owing to the new Education Act. While on this question, he called the attention of the shareholders and that of the public to the great injustice railway companies suffered from under the rating arrangements of certain districts. An Assessment Committee ought, he said, to be a judicial committee, and they should endeavour to act equitably between all classes of ratepayers. But he had had put before him recently a minute of one of the large London Boroughs showing how they remunerated their rating official. This borough singled out the railways within the district for the purpose of giving a larger commission—paying by commission their valuer of railway property. What ought to happen—and what had happened before—was that their rating clerk should meet the rating official of the Assessment Committee and settle figures, and on these figures, if any principle were involved, the point should be referred to the Committee. The minute in question, however, entirely changed this plan. It said: "That the services of A and B be retained to undertake the valuation of railway property for the commission of 1 per cent. of the rateable value finally established; and in the event of appeal, an additional fee of ¾ per cent. of the rateable value finally sustained." A premium was thus put upon going into litigation, and spending both the ratepayers' money in defending, and the railway shareholders' money in opposing, the assessment.

BRENTFORD GAS COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held on Friday, at the Charing Cross Hotel—Mr. HOWARD CHARLES WARD in the chair.

The SECRETARY (Mr. William Mann) read the notice calling the meeting; and the Directors' report and accounts were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said he had very little to say on this occasion. But he must first congratulate the proprietors upon the state of the accounts, in spite of the hot weather and the fact that the Company reduced the price of gas at Lady Day, 1904, which represented a considerable amount on their consumption. The price of gas for the winter quarter of the June half of last year was 2s. 11d., against 2s. 9d. for the whole of the past six months. But, in spite of this, the accounts did not show much less profit than in the June half of 1904. The proprietors would understand this, because not only was there the difference in the price received for the gas, but they, like other companies, had suffered from the great fall in the value of residuals. Notwithstanding this, and having charged the half-yearly account with everything that they fairly could, and most liberally, the Directors were enabled to come before the proprietors with an account for the half year which allowed them to increase the dividend by ½ per cent. on the ordinary and new stock, 1881; and after charging this increased dividend, they still had a surplus. The profit for the half year was £40,421. The sum required for dividend, including the addition, was £39,250; so that, after providing for this, and charging most generously against the revenue account, they still had a surplus of £1171. The balance brought from the last account was £62,233. From this they took £3400, contributed to the reserve fund, and £1000 for the insurance fund; leaving a sum of £57,833. Adding to this the surplus of £1171 on the past half year, they were enabled to carry forward £59,004. This was the gist of the matter; and he regarded it as very satisfactory. If any of the proprietors took exception to the accounts, he considered they would be most unreasonable. He did not want to take them through a long list of figures, but he thought they would be glad to know there had been an increase in the number of ordinary consumers, compared with the June half of 1904, of 1339, in prepayment consumers of 1931, in ordinary stoves of 943, and in prepayment stoves of 1492. Then another matter, which anyone who was accustomed to gas accounts would see was the very *crux* of the well-being of the Company, was the great difference between the capital employed thirty years ago and to-day. In 1875, it equalled 18s. 9d. per 1000 cubic feet, or £7 18s. 2d. per ton of coal; in 1905, it was 10s. 2d., or £5 4s. 5d. per ton. The matter did not end there. It would be very interesting for the proprietors to know that, although the capital per ton of coal was £5 4s. 5d., the dividend and interest bearing capital was only £4 7s. 8d. per ton; that was, excluding the premiums on the issue of capital on which no dividend was paid, instead of the capital representing 10s. 2d. per 1000 cubic feet sold, it was only 8s. 9d. He thought this was a very good story to have to tell the proprietors.

Mr. J. REESON congratulated both the Directors and the proprietors on the magnificent result achieved, considering the great disadvantage of the low price of residuals. They had lost about £5000 on residuals compared with the June half of 1904; and the distribution expenditure amounted to about £4200 more. These two items together came to about £9200, which was partly met in this satisfactory way. They had a diminution of £2700 in the cost of coal and oil; and, notwithstanding the great decrease in the price of gas of 2d. per 1000 cubic feet, applying to only one quarter of the June half of 1904, but to the whole of the past half year, an increase of rental of £2000. There was another matter. The Chairman would probably remember that on a former occasion he called attention to the decrease in the average receipts, which could hardly be understood at the time, in respect of the slot meters. He was glad to see there was an increase of £1700 on this occasion. Taking these items together, it left them short by about £3000 in the profit. Notwithstanding this, the Directors saw their way to pay a higher dividend. He did not regard them as "plungers"—they were very far from that; and in declaring the higher dividend, they no doubt saw their way to a still further increase in the profits.

The motion was unanimously carried.

Proposed by the CHAIRMAN, and seconded by Mr. BURKE, dividends for the half year were declared, subject to the income-tax, at the rate of 5 per cent. per annum on the 5 per cent. preference stock, at the rate of 12½ per cent. per annum on the consolidated stock, and at the rate of 9½ per cent. per annum on the new stock.

The CHAIRMAN subsequently remarked that there was a very funny thing about their stock. There were so few dealings in it that the stock paying 12½ per cent. was quoted at the same value on the Stock Exchange as that of another Company with which he was intimately connected, where the dividend was only equal to 11 per cent., though the Brentford stock was worth a good deal more, or he thought ought to be. However, the results with which they had that day presented the proprietors had been brought about by the assiduity of their executive officers. Mr. Mann took great interest in the work of his department; but Mr. Husband (their Engineer and Manager) was the man whose skill produced these excellent returns.

Mr. A. W. OKE proposed a vote of thanks to the Chairman and Directors and the officers. The proprietors, he remarked, were very grateful for the increase in the dividend; and the consumers, no doubt, for the very liberal reduction in the price of gas. It was most satisfactory to find that, notwithstanding the reduction in the price of gas, they could pay the increased dividend out of the profits, and still have a balance to carry forward. Instead of a decrease in consumption of 1·8 per cent. that another Company were showing, they had an increase of 5·17 per cent.

The CHAIRMAN: The Company to which you refer had a decrease in price of 1d. per 1000 cubic feet during the whole half year.

Mr. OKE: We were able to reduce by 2d.; and still show these excellent returns.

Mr. REESON seconded the motion, which was unanimously carried.

The CHAIRMAN'S response concluded the proceedings.

ASCOT DISTRICT GAS COMPANY.

The Ordinary General Meeting of this Company was held at the London Offices, No. 50, Cannon Street, E.C., on Tuesday last—Mr. JOSEPH MANWARING in the chair.

The SECRETARY (Mr. W. A. Schultz, F.C.A.) read the notice convening the meeting, and the minutes of the previous meeting; and the report and accounts were taken as read. The report stated that there was a profit of £1976 on the working for the half year to June 30; and after providing for every charge, there remained a balance of £2162 at the credit of the profit and loss account.

The CHAIRMAN, in moving the adoption of the report and accounts, remarked that he was pleased to be able to draw attention to the fact that the revenue of the Company continued to show an increase. The quantity of gas sold during the half year under review was 18,916,000 cubic feet, as against 18,603,000 cubic feet in the corresponding period of last year. This was an increase of 313,000 cubic feet; and there was a consequent increase in the gas-rental of £70. On the face of it, this did not appear to be a very large growth; but it had to be borne in mind that the district remained much the same from year to year. Then again the Ascot races did not appear to bring about the letting of furnished houses to the extent that they used to do. The growing fashion of motor cars amongst the well-to-do tended to enable those who frequent the races to live at a distance, and to go into Ascot by means of their cars, rather than set up establishments in the neighbourhood. Whatever might be the cause, however, it was certain that the renting of furnished houses had not been so great this year as in former ones. It was satisfactory therefore to find that in spite of the change of the times the Company held their own, and even showed an increase. There were indications that movements were on foot for the purpose of establishing public lamps in some of the districts which were at present not lighted. The average price realized for coke was 17s. 7d. per ton, against 18s. 1d. in the corresponding period of last year; but other residual products had maintained their position. On the other side of the revenue account, the cost of manufacture was less by £56, though a larger quantity of gas was sent out. The unaccounted-for gas during the half year amounted to 4·97 per cent., as against 5·58 per cent.; while the quantity of gas sold per ton of coal carbonized was 10,430 cubic feet. Distribution charges remained much the same; but management charges were £46 heavier than in 1904. The net was a profit of £1975, as against £1930 last year. This enabled the Directors to recommend the payment of a dividend at the rate of 5 per cent. per annum, less income-tax, after meeting the charge of £219 12s. for interest on mortgage debentures. The Board would have liked to have repeated the payment of the dividend free of income-tax; but they are of opinion that this would not be wise. It would be noticed that the only capital remaining to be issued now was a small sum of £4020 available on the debenture stock. It would be necessary, however, in the not over-distant future to face the question of the enlargement of the retort-house; and when this was taken in hand, the Company would probably have fully exhausted their authorized capital. Meanwhile, there were always certain capital charges for the laying of service-pipes and new meters, and in a few instances for the extension of the mains; and it was only prudent to set aside from the realized profits a sufficient sum to meet these small capital charges as they came along. It would be borne in mind that there was really no reserve at the present time; that which appeared in reserve for renewal of plant being simply the £1200 set aside from the accumulated profit at the last half-yearly meeting, to cover the charge for the new purifiers which were now nearly completed. The Directors thought the shareholders would endorse their views—feeling that it was better to get a safe 5 per cent. dividend with the prospect of its continuance rather than pay away the whole of the profit earned and leave the Company under the necessity of having to borrow money to pay the dividends, or issue the capital which it was certain would be required for further extensions. The capital expenditure per ton of coal carbonized was £18 6s. 9d. per ton. The number of ordinary consumers at June 30 last was 704, and of prepayment consumers 394; the figures for the previous year being 688 and 340 respectively. At the close of the half year covered by the accounts the Company had 548 stoves on hire, as against 483 in the corresponding period of 1904.

Mr. SAMUEL SPENCER seconded the motion; remarking that everybody must be perfectly satisfied that the Board were doing the best they possibly could for the shareholders.

Dr. H. J. STRONG, J.P., thought the report very satisfactory from every point of view—that was to say, the revenue was increasing while the expenses were not doing so in an abnormal proportion. He wished to endorse the action of the Directors in not this time paying the dividend free of income-tax. The additional amount distributed to the shareholders by declaring the dividend free of income-tax was very small, was only about £75 he believed; and as it was desirable that a beginning should be made towards the creation of a reserve fund, he would suggest that this sum, and say another £25, should be set aside for the purpose. Directly they had a reserve fund, he was confident the value of the shares would be materially added to.

The SECRETARY, in reply to a question as to the additional amount under management charges referred to by the Chairman, explained that when he was appointed Secretary of the Company, something like seven years ago, it was necessary to have new books, stationery, &c., and it just happened that the stock of everything had run out during the past half year.

The resolution was then carried unanimously.

On the motion of Mr. SPENCER, seconded by Mr. FLOATE, a dividend for the half year was declared at the rate of 5 per cent. per annum, less income-tax. The former gentleman remarked that, if the sum hitherto paid for income-tax, so that the dividend should be free, was set aside as suggested by Dr. Strong, that would make £150 a year, and it would help on the reserve fund, which it was very desirable should be built up.

Mr. ORAM proposed, and Dr. STRONG seconded, a vote of thanks to the Chairman, Directors, and officers for their services; the compliment being acknowledged by the Chairman and the Secretary.

PROVINCIAL GAS AND WATER COMPANIES.

Gas.

More Gas from Less Coal at Cambridge.

The report submitted to the shareholders in the Cambridge University and Town Gaslight Company, at their half-yearly meeting on Monday of last week, stated that the trading during the six months to June 30 had been satisfactory. The renewing of the last part of the old carbonizing plant had been commenced, and would be finished in time for use during the ensuing winter. With the completion of this work, the whole of the carbonizing plant will have been renewed and fitted with mechanical stoking apparatus. The next important renewal which would have to be taken in hand was that of gasholder No. 2, which the Directors hoped to commence during the present financial year. In moving the adoption of the report, the Chairman (Mr. E. H. Parker) said that there was a sum of £6938 to be carried to the profit and loss account. This was sufficient to provide for interest on the mortgages, income-tax, and the payment of the maximum dividend, and leave the substantial sum of £414 to carry forward. He hoped this would be considered satisfactory, especially when the low price of residual products was taken into account. It would be seen they received for these products last half year £6646, compared with £7290 in the corresponding half of the previous year. He thought, too, the result was very satisfactory when they considered the large sums they had to pay for renewals during the year. As showing how well the Company was managed, he pointed out that, though the make of gas during the six months was over 3½ million cubic feet greater than in the corresponding period, 277 tons less coal had been used. This, he said, proved how very skilful was the working now going on. He thanked the Engineer and Manager (Mr. J. W. Auchterlonie) and the Accountant (Mr. S. G. Wheaton) for the way they had carried out their duties. The maximum dividend was declared, and the Directors' remuneration was increased from £300 to £500 per annum.

Cheaper Gas at Durham.

The report which was adopted at the half-yearly meeting of the Durham Gas Company last week recommended the payment of a dividend of 5 per cent. on the original and 3½ per cent. on the additional capital for the six months. In the course of his remarks, the Chairman (Mr. John Coward, J.P.) said that there had been a falling off in the consumption of gas during the half year to the value of £103 as compared with the same period of last year; but this seemed to be the case with most companies, and was due to the exceptionally bright weather. The Directors had decided, commencing with the new quarter on Oct. 1, to reduce the price of gas by 2d. per 1000 cubic feet, bringing it down to 3s., off which there would be the usual reduction of 2d. This reduction would apply to large and small consumers alike; and to those who used penny-in-the-slot meters there would be a corresponding advantage in larger pennyworths. The Directors intended to consider the advisability during the next three months of supplying gas to consumers in the new areas proposed to be added to the city, at the same price as was paid by consumers at present within the borough, instead of at the higher rate they were now paying. The reduction in the price of gas would mean a difference of about £850 a year.

The Public Lighting Question at Malton.

The half-yearly meeting of the Malton Gas Company last Thursday was specially interesting from the fact that it was the first opportunity the Directors had of explaining the circumstances under which the public lighting had been taken out of the Company's hands with the view of electricity being substituted for gas. The report presented by the Directors showed that a sum of £3421 was available for distribution, and it contained a recommendation that a dividend of 6 per cent. for the half year ending June 30, free of income-tax, should be declared. This would absorb £1440, and leave a balance of £1981 to be carried forward. In moving the adoption of the report, the Chairman (Mr. Hugh W. Pearson) dealt at considerable length with the above-named question. He recited and commented upon its various phases, and went over the ground covered in the articles which have appeared in recent issues of the "JOURNAL." He said the Company had no complaint to make against the Electricity Company; they wished them joy of their contract, and hoped they would find a better security for, and a better return upon, their money invested in public lighting plant than the Gas Company had found. It was an uncertain tenure, and could not be regarded as a gilt-edged security. The Electricity Company seemed to have taken the contract at less than 1d. per unit, to include all labour, material, and interest on capital. As the largest electricity concerns could not sell the current, even for power purposes, and without all the outgoings of a public lighting contract, at less than 2d. per unit, and as the Company at Malton charged 5d. per unit to private consumers, they were either undertaking to light the town at a heavy loss, which the Directors believed to be the case, or they were charging their private customers 500 per cent. profit. Anyhow, if the public lighting had to be done at a loss, the Gas Company preferred to be without it. In the past they had contracted for it at prices leaving the minimum of profit, and had always given more light than they had contracted for. It had been said that if the Electricity Company had come to Malton ten years ago, the ratepayers would have saved £1000. But the statement was not only regardless of the price at which either gas or electricity could in the interval have been produced and sold, but was really too stupid, one would think, to need refutation or to deceive anybody. The fact was that prior to the advent of electricity at all, the Gas Company had reduced the price of gas from 4s. to 2s. 10d. per 1000 cubic feet, that they had made a further reduction of 4d., and were now offering their consumers in Malton and Norton a better illuminant than the Electricity Company could supply, and at less than half the cost. The price of gas in Malton was now, and had been for years, less than it was in any other town in the kingdom of the same size, and even much larger, and at a similar distance from the coalfields. They had heard a great deal lately about the ratepayers—chiefly from members of the Council, whose contributions to the rates were infinitesimal. He would just point out that the Gas Company were rated in Malton on £750, and the shareholders in the town on £2700—no inconsiderable proportion of the whole rating, while about £22,000 of the share and mortgage capital of the Company out of a total of £29,000 was held in Malton; thus keeping the profits of the undertaking in the place. He believed about £200 nominal of the capital of the Electricity Company was held there. On the decision of the Council being made known, the Company at once resolved to remove their standards and lamps, because they should decline in future to supply them or any other appliances or plant for street lighting, or undertake the labour of lighting and extinguishing. If the Malton Local Authority in future required gas for the streets, the Company would, of course, be ready to supply it at the current price charged to other consumers. That was all they would undertake; and they were not likely again to tender for the street lighting of Malton. The Directors were writing off out of revenue a sum amply sufficient to cover the depreciation of the street lighting plant, and proposed to spread it over three or four half years. Beyond the fact that they had to suffer this depreciation, the loss of the public lighting contract was not calculated to make any material difference in the earning power of the Company. The contract had not in the past left them a profit equal to more than, if as much as, 5s. per cent. on the paid-up capital. The report was adopted, and the dividend recommended declared.

Consumers Changing from Electricity to Gas at Newport (Mon.).

The accounts submitted at the half-yearly meeting of the Newport (Mon.) Gas Company last Wednesday showed that the receipts during the six months amounted to £34,242; while the expenditure was £26,878—leaving a balance of £7364 to go to profit and loss account. This, with the amount brought forward from the last accounts, made a sum of £11,111 available for distribution; and out of this the Directors recommended the payment of the usual dividend. Since Dec. 31, £1681 had been spent on capital account, making the total expenditure under this head £314,213. The private consumption in the period under review amounted to nearly 153 million cubic feet. In moving the adoption of the report and accounts, the Chairman (Mr. R. Laybourne) said that, having got a reduction in the price of coal, the Board, as promised, had lowered the price of gas. He regretted that the economy hoped for had not been fully realized. Some 346,000 cubic feet more gas had been sold; but the money received was less. Besides this, a considerable fall had taken place in the price of residuals, which realized £1228 less than in the corresponding half of 1904. A gratifying increase had taken place in the number of consumers; and many people had abandoned the use of electricity for gas, with a great saving in the amount of their lighting bills. The public lighting authorities, however, required more light infusing into their minds before they would follow the lead of London and other large cities and towns in the adoption of incandescent gas in place of electricity. It was a notable fact that some of these places provided their own electrical current, which they had abandoned. It was hoped, in the interest of ratepayers, that a similar course would be adopted at Newport. As producers of gas it was of small importance to the Company, as the profits on public lighting were reduced to the narrowest limit; but as suffering ratepayers they should not object to economy in public lighting, coupled with efficiency. The Workmen's Thrift Society was making progress, and showing its utility in providing for the temporary wants of the workmen. It was also being drawn upon for holiday purposes, and the visits of themselves and their families to the seaside or to see their friends residing at a distance. Anything that encouraged thrift on the part of workmen was desirable. The report was adopted; and a dividend of 5 per cent. on the consolidated stock was declared. The proceedings concluded with a vote of thanks to the Chairman, Directors, and staff, to which the Secretary (Mr. T. H. Hazell) and the Engineer (Mr. Thomas Canning) briefly replied.

Working under New Conditions at Sutton (Surrey).

The half-yearly general meeting of the Sutton Gas Company was held on Monday last week—Mr. F. Budgen, J.P., in the chair. In their report the Directors stated that for the half year ending the 30th of June—the first under the Company's new Act—the revenue, owing to the reduction in the price of gas of 2d. per 1000 cubic feet, showed a decrease of £544. The returns from residuals, however, had increased by £700. The quantity of gas sold for the six months was 76,726,000 cubic feet, or an increase of 2¼ per cent. compared with the corresponding period of last year. The Directors recommended a dividend of £2 17s. 6d. per cent. for the six months, less income-tax, out of a balance of £12,185. They had deemed it advisable, owing to the increase in the Company's business, to erect four new purifiers. In moving the adoption of the report and accounts, the Chairman said the new purifiers would cost £2500. They had spent £1200 in acquiring a piece of land adjoining the works, through which ran the principal main. The number of consumers was 4055—an increase of 505. He mentioned that the new Act permitted the Company to have a sliding-scale, and pointed out that for every 1d. per 1000 cubic feet the price of gas was reduced, the revenue lost £300, whereas an increase of 1s. 3d. per cent. in the dividend only cost £62; so that the shareholders only got one-sixth and the consumers five-sixths of the benefits. Mr. T. Charles seconded the motion, and it was carried unanimously. The dividend recommended was declared; and it was decided that the Directors' fees should be increased by £200.

Increase of Capital at York.

Mr. J. R. Hill, the Chairman of the York United Gaslight Company, when presiding at the half-yearly meeting last Thursday, said the accounts showed an increased revenue of £850. They had increased the reserve fund by £6000 under the powers which they obtained in 1898 to raise £20,000 of ordinary stock, and in 1903 £40,000 of preference stock; and they proposed to apply the income to further increasing the reserve. The adoption of the report was agreed to, as was also the payment of a dividend of 4 per cent. on the preference and the consolidated stock. An extraordinary meeting was afterwards held, when a resolution was carried giving the Directors power to raise the balance of the capital still remaining unissued, in accordance with

the Act of 1898, and to borrow on mortgage £5000 in respect of capital account. The Chairman explained that they proposed to raise the remaining £20,000 of capital. They did not anticipate doing so immediately; but in view of the state of their capital account, which was overdrawn by £10,600, and the further outlay which they expected at the works, they thought it desirable to have the shareholders' sanction for the issue of the capital.

Water.

Progress of the Colne Valley Water Company.

The business of this Company continues to grow, and consequently the Directors had to expend £5735 in the six months ending the 30th of June, upwards of £3000 of which was for extensions of mains, including part of the cost of a 10-inch pipe from Bushey Heath to Elstree, to improve the supply in that neighbourhood. To meet further capital expenditure, it has been decided to issue next month 900 new £10 shares, the balance of the 2500 authorized to be issued three years ago. The revenue from water-rates in the half year was £17,476, and the total receipts were £17,943, compared with £16,600 in the corresponding half of 1904. The expenditure for the two periods was £7006 and £6495 respectively; leaving £10,937 and £10,105 to go to the dividend and interest account. The sum of £10,776 was available for distribution at the half-yearly meeting held at the Company's offices at New Bushey last Tuesday; and after taking from it £1000 to be added to the contingency fund account, the Directors recommended the payment of dividends at the rates of 8½ and 7 per cent. per annum on the 10 per cent. and 7 per cent. maximum shares—leaving £1134 to be carried forward. For the corresponding half of last year, the dividend on the 10 per cent. stock was at the rate of 8 per cent., £500 was transferred to the contingency fund account, and £943 was carried forward.

Progress at Leatherhead.

The report which was submitted to the shareholders at the half-yearly meeting of the Leatherhead and District Water-Works Company last week, stated that the receipts for the six months to June 30 amounted to £4192, and the working expenses to £2251—leaving a profit of £1941. To this had to be added £1545, the amount brought from the previous accounts, making a total of £3486. Deducting from this sum £187 interest on the debenture stock, there remained £3299 available for division. Out of this, the Directors recommended a dividend at the rate of 8 per cent. per annum on the original shares, and 7 per cent. on the other shares. This would absorb £1499, and leave a balance of £1800 to be carried forward. During the half year 65 new services were laid on. A report by the Engineer (Mr. F. S. Cripps) was appended, in the course of which he stated that the supply during the six months had been satisfactory in both quantity and quality. A new engine-house had been built; and the erection of the engine and pumps would shortly be completed. About 1000 yards of 8-inch and 700 yards of 6-inch mains had been laid for augmenting the water supply to Oxshott; and, in addition, some 1000 yards of 4-inch and 3100 yards of 3-inch mains were laid in other parts of the district during the half year. In moving the adoption of the Directors' report, Colonel Gleig, J.P., the Chairman of the Company, remarked that last half year they paid dividends of 8 and 7 per cent. and added £195 to the carry forward; whereas on the present occasion, after paying the same dividends, they would add £225 to the sum carried forward. This showed that they had kept the expenses down. The rental from the 65 new services would, it was anticipated, be £255 a year. The satisfactory premium received on the last issue of 400 shares (which were allotted at an average price of £14 2s. 4d. per £10 share) had been sufficient to cover the expense of purchasing some land which the Board had long had their eyes upon, and which would be found in various ways an advantage to the Company to possess. The Directors thought it as well not to increase the dividend at present; but they could have paid 10 per cent. on the original shares. In a year or so they might feel that the higher rate was assured, and that the payment of back-dividends was coming into sight. Since the commencement of the undertaking, they had raised £65,100; and they had authority to the extent of £86,875. They had thus a potential capital of about £21,000 behind them. The whole of this, however, was not available for spending on new plant, &c., because £1800 of it was owing to the dividend account. They had accumulated this sum from the dividends, and had employed it as capital, on which they did not, of course, have to pay interest. They had this amount to draw upon in case at any time it was needed to keep up the dividend. The quantity of water pumped during the past half year was 78,428,000 gallons, as against 87,123,000 gallons in the corresponding period of last year. There had, however, been a larger revenue—the less quantity of water pumped being in consequence, to a great extent, of the fact that leakages had been stopped. The report was adopted; and it was subsequently agreed that the Directors' remuneration should be increased by £100 a year—from £300 to £400—as from Jan. 1 last. In the course of the proceedings, reference was made to the good work done on behalf of the Company by Mr. Cripps and the Secretary (Mr. John Young), as well as by the Directors generally.

A Half-Lighted Village.—A public meeting was held at Uffculme, Devonshire, last Saturday week, to consider what steps should be taken with regard to the lighting of the village during the coming winter. For some years past the owners of a factory have lighted one half of the place free of cost. The expense of lighting the other half was formerly defrayed by voluntary subscription; but there being no money in hand, this half has been in darkness for several winters. It was proposed to levy a rate and light the whole village with gas. To this the farmers who would have to pay the rate were opposed. There was a good deal of discussion, and eventually a deputation was appointed to interview the owners of the factory with reference to a suggestion that the village might be lighted by electricity from an installation which is to be carried out at the factory.

STOCKPORT CORPORATION GAS DEPARTMENT.

The Charges of Mismanagement.

At the Meeting of the Stockport Town Council last Wednesday, the report of the Special Committee appointed a short time ago to investigate charges brought by Mr. Glithero of mismanagement in the Gas Department was presented, and the conclusions arrived at were embodied in the minutes of the Gas Committee. The following are the principal portions of the report, as far as our readers are concerned.

Dealing first with the position of the Gas Engineer (Mr. S. Meunier) in relation to consultative work, the Committee say:

The Gas Engineer has, on five occasions at least, taken outside work. By his agreement he ought not to take such work without the consent of the Gas Committee. It is admitted by him that he has made reports and received fees in the following instances: Poynton Gas Works, for Lord Vernon, fee 7 guineas; Stoke, fee 12 guineas (including expenses); Leek, fee 10 guineas; Newcastle-under-Lyme (with regard to the electrical undertaking), fee 10 guineas; Oswestry, fee 10 guineas (and expenses). In the first three cases, no previous consent of the Committee is recorded on the minutes. The Gas Engineer states that he afterwards obtained the approval of the Committee to the work at Poynton, and that he obtained the sanction of the Chairman (Alderman Webb) to the work at Stoke. From the draft minutes of January, 1902, it appears he was reporting on two schemes. The Committee resolved "to allow the two instances to go on, but he must ask the Committee in future."

The Committee next proceed to consider the questions of coal analyses and contracts, and the disposal of residuals, and report as follows:—

We consider the Gas Committee, when considering tenders, should have before them complete analyses of the coals under consideration, to enable them to decide which is the best value. Reports of the analyses of the coals when supplied should also be placed before the Committee to see that the quality of the bulk is up to sample. The analysis books should be accessible to all members, and produced at every Committee meeting. We recommend the Gas Committee to take into consideration the permanent or occasional employment of some independent analyst who will report direct to them. We recommend that all tenders be sent to the Town Clerk's Office, addressed "Gas Committee," in future; and we deprecate the acceptance of any amended tenders after the date specified for delivery. We still more strongly condemn the practice of afterwards appointing either Sub-Committee or Gas Engineer to negotiate with certain colliery proprietors or merchants for reductions in tenders. We do not consider the Committee are justified in authorizing the Gas Engineer to buy spot lots of coal; and the practice ought to be discontinued at once.

In our opinion, the residuals ought to be advertised for sale by tender. If these recommendations are adopted, it will not be necessary for the Gas Engineer to attend the Coal Exchange, and he will be able to devote the whole of his time and attention to personal supervision and management of the works, which we consider essential. With reference to the insinuation of Councillor Glithero that there was some irregularity in the correspondence in March, 1904, between the Gas Engineer and coal contractors, and the arrangements thereby made for meetings, we think such insinuation is unfounded.

The adoption of the report was moved by Alderman Clarke, who said the Committee had given a great amount of time and labour to the inquiry. Mr. Glithero had been granted a full and patient hearing and every latitude; and everything had been done to have a full investigation. The Gas Engineer had served the Corporation for 14½ years. With regard to outside work, in 1896 he was consulted by the Stoke Corporation without the authority of the Gas Committee, but subsequently obtained it. He had been asked if he had taken any other work, and he said he had done work for Newcastle, Oswestry, and Leek. For the two former places permission was recorded in the minutes; and with regard to Leek, it was given in the draft minutes, but not mentioned in the printed minutes. As to the coal contracts, the tenders had since last November been sent to the Town Clerk's Office, which was the proper place. Since 1900, Sub-Committees had been appointed to deal with tenders, with a view to reductions, and this plan had held good until practically last March, when they made new contracts. Tenders were not now delegated to a Sub-Committee. As to the coal analyses, the Committee had thought it would be better to have an independent analysis occasionally. With regard to "spot" lots of coal, none had been bought by the Engineer; everything with regard to these lots had been before the Committee. He regarded the report as fair and satisfactory; and he might point out that, with the exception of the numbering of stoves, all the suggestions made by the Inquiry Committee had practically been carried out by the Gas Committee since last November.

The motion having been seconded, Mr. Glithero made a lengthy speech in regard to the inquiry. He said he had been studying the question of the irregularities in the Gas Department for two years. He knew there was something radically wrong, and he made a vow that he would not rest until he had altered it. He brought before the Committee 20 different charges, and 23 witnesses, 12 being Corporation employees and 11 outsiders. But there were shoals of things of which he could only touch the fringe. Having been repeatedly appealed to to shorten his remarks, he concluded by saying that what he had done would eventually save the ratepayers thousands of pounds.

Other members of the Council having spoken, Alderman Clarke said with respect to all that had been going at the gas-works, he was glad it was not under the administration of the party at present in power. Mr. Meunier had been blamed for things for which someone else was responsible. With reference to the insinuation by Mr. Glithero that there were some irregularities between the Gas Engineer and the coal contractors, the Committee were unanimous in their decision that the statements were unfounded; and in fairness to the Engineer, who, as an official of the Corporation, had a character to uphold, Mr. Glithero ought to withdraw it. [Mr. Glithero said he would not do so.] In conclusion, Alderman Clarke said he thought he had given a satisfactory explanation; and he hoped in the future everything would be carried out properly.

The minutes were approved.

WARRINGTON CORPORATION GAS DEPARTMENT.

In his annual report to his Committee, Mr. W. S. Haddock, the Engineer of the Warrington Corporation Gas-Works, states that the income from residuals during the year ending March 31 was very much reduced, owing to the lower prices obtained and to the fact that less coal was carbonized. The station meter at Longford indicated an increased make of more than 5 million cubic feet; whereas the sales showed a reduction of over 9 million feet by ordinary meter and an increase of nearly 6 million feet by prepayment meter—making a reduced sale of more than 3 million feet on the year. As the sales and make are thus so contradictory, Mr. Haddock suggests the advisability of testing the station meter. During the year a large number of mains were renewed; and the distributing system was kept in good order. There were, however, no abnormal defects to remedy, which would assist to explain an increased leakage. The reduced sale of gas by ordinary meter is, Mr. Haddock remarks, very disappointing; but he trusts it may only be temporary. The exact increase in the make of gas was 5,339,000 cubic feet, or 1·4 per cent. upon the previous year's production.

With regard to the working results, 36,166 tons of coal and cannel were carbonized for a make of 396,463,000 cubic feet, or 10,962 feet per ton, as compared with 10,068 cubic feet in the preceding year. The quantity sold and accounted for was 370,304,656 cubic feet. The largest make in one day was 1,757,000 cubic feet on Dec. 2; while the greatest quantity sent out in one day was 2,132,600 cubic feet on Dec. 23. The smallest make was 566,000 cubic feet on June 11; and the smallest amount sent out, 417,900 feet on Aug. 7. The cost into the holder of the gas made was 6·216d. per 1000 cubic feet, as compared with 6·283d. in the previous year; and the cost delivered at the consumers' meters, 16·978d., as against 17·563d. The cost, including all charges, was 23·597d. in the year under review, and 24·349d. in the preceding twelve months. The average price of coal and cannel came to 8s. 1d. per ton, compared with 8s. 7d. The expenditure was £49,852, against £54,281; and the revenue £67,558, against £71,953. The expenditure was thus £4429 less than in the previous year, and the revenue £4395 less. Among the receipts are the following items: Gas, £57,374; meter-rents, £1133; fittings, £1584; coke, £10,033; tar, £579; tar products, £1571; sulphate of ammonia, £1998; cooker-rents, £434.

LEIGH (LANCS.) GAS AND WATER SUPPLY.

Annual Report and Accounts.

The Leigh (Lancs.) Gas and Water Committee have lately had presented to them the annual report of their Engineer and Manager (Mr. James Gibson), on the working of the two Departments for the twelve months ending March 31.

He states that during the year a new exhauster and engine combined and a new washer-scrubber were erected; and these additions will enable the exhausting and scrubbing plants to cope with the make of gas for many years to come. After paying over to the public lighting rate the sum of £1049, by supplying gas to the public lamps at net cost, the net profit on the gas-works was £958, as compared with £3057 for the previous year. This decrease of £2099 is accounted for by a lessened revenue of £1075 from gas sold and of £884 from residuals. There was also an increase in rates and taxes and in the cost of fixing stoves, as well as in the capital charges; but these were practically counterbalanced by the saving effected in coal. The cost of maintenance and general repairs was again reduced. The total length of mains of all sizes at the end of March last was 47 miles 233 yards; 1 mile 534 yards having been laid during the year. In the twelve months, 299 new services were laid and 94 defective ones replaced. At the beginning of the year, there were on the register 3059 ordinary consumers and 3784 prepayment ones, making a total of 6843; and at the end of the year there were 2949 ordinary and 4180 prepayment consumers, or a decrease of 110 ordinary meters (3·59 per cent.) and an increase of 396 slot meters (10·47 per cent.)—the total increase of consumers for the year being 286, or 4·18 per cent. On March 31 there were 2486 gas-stoves in use, and 773 grillers. The number of incandescent public lamps increased from 245 to 280, while the ordinary ones decreased from 478 to 463; the total increase of public lamps for the year was thus 20, or 2·76 per cent. With regard to the working, the quantity of coal and cannel carbonized was 13,763 tons, as against 13,750 tons in the previous year; while the gas sent out was 152,084,000 cubic feet, compared with 151,333,000 feet—an increase of 751,000 feet, or 0·49 per cent. The gas sold (including public lamps) was 142,617,100 cubic feet, against 146,062,700 feet—a decrease of 3,445,600 cubic feet, or 2·35 per cent. The total gas accounted for was 144,641,400 cubic feet, against 147,906,400 cubic feet—a decrease of 3,265,000 cubic feet, or 2·20 per cent. The decreased consumption Mr. Gibson ascribes to the more general use of incandescent burners. The maximum day's consumption during the year was 909,000 cubic feet, which was a record. Considerable difficulty was experienced in meeting this consumption; but an installation of carburetted water-gas plant (of 350,000 cubic feet a day capacity) which is now being erected will remove all cause for anxiety on this score during the coming winter. With a view to increasing the consumption of gas, especially during the summer months, Mr. Gibson thinks it would be advisable to consider the question of abolishing as soon as possible the whole of the rents for cooking-stoves. By doing this, he says, the somewhat heavy costs of fixing and re-fixing stoves (which last year amounted to over £463) would be largely diminished. The total receipts from stove-rents during the past year amounted to £308; and to make up for this reduction in revenue, an increase of about 4,000,000 cubic feet per annum in the consumption would be required. The saving that would be effected on fixing and re-fixing the stoves, together with the increased consumption that would result from the abolition of all hiring charges, would, Mr. Gibson is sure, fully compensate for the loss of the present receipts for the hire of cooking-stoves. During the past year, the make of gas per ton of coal and cannel carbonized was again slightly increased; it being now 11,050 cubic feet. The average cost of coal, cannel, and benzol (including carting) for the year was 11s. 1 468d. per ton, or a little over 8d. less than in the previous year. This, remarks Mr. Gibson, is a very satisfactory reduction, when it is remembered that the contract prices for coal were in general only 3d. per ton less. The saving was effected by the use of nuts and slack whenever possible. The make of coke per ton of coal and cannel carbonized showed a slight increase; but the revenue from this source was some £300 less, owing to the lower prices obtained and the general depression in the coke market. The make of tar also increased; but, owing to the low price, the receipts from this source were £385 less. The make of sulphate of ammonia was somewhat disappointing; but this was in consequence of a smaller quantity of ammoniacal liquor being available. Mr. Gibson again calls attention to the fact that by supplying the gas for the public lamps at net cost (1s. 2d. per 1000 cubic feet) instead of at the price paid by large consumers (2s. 8d.), the department are contributing a large sum for the benefit of the ratepayers. A summary of analyses which accompanies the report shows that of 33 large towns Leigh has the highest capital charges per 1000 cubic feet of gas sold (16·67d.); but no place whose capital charges exceed 12d. per 1000 cubic feet sells gas so cheaply as Leigh. As regards the gross cost of gas in the holders, Leigh is among the lowest in the list. Of the net profit of £958 on the year's working, £951 has been used in the extensions to the exhausting and scrubbing plant and in writing off old meters. Of the gross profit of £10,868, the sum of £9909 was required for sinking fund and interest.

The profit on the Water Department for the past year amounted, after deducting £70 for bad debts, to £970, as compared with £525 for the previous year. The total length of mains at March 31 was 31 miles 989 yards. During the year 225 new services were laid on, and 113 defective ones repaired. The quantity of water paid for to the Liverpool Corporation was 48,968,000 gallons. For trade and domestic purposes 43,527,100 gallons were sold by meter, yielding a rental of £2962, as against £2678 in the previous year. The remainder of the water, which was supplied on assessment, yielded £6017, as against £4986. The average yield was 11·77d. per 1000 gallons. The capital invested in the undertaking is £52,954. The gross profit last year was £2848; and the payments for sinking fund and interest amounted to £1878. Taken on the population supplied—*i.e.*, 43,000—the consumption per head per day was 11·03 gallons; and leaving out the quantity used by meter for trade purposes, the consumption was 8·96 gallons per head per day for domestic purposes.

STOKE CORPORATION GAS SUPPLY.

In moving the adoption of the Gas Committee's minutes at the monthly meeting of the Stoke Town Council, Alderman Geen referred at some length to the past year's working.

He said the profit was probably the highest, or nearly the highest, on record. The total profit, after meeting all expenditure, including interest upon loans and money borrowed from the bank, was £6067, as against £5195 the previous year. Out of this profit, the Gas Committee repaid loans to the extent of £1112; they spent £1090 upon capital outlay; they paid to the Corporation in relief of rates £1597; and the remainder, £2268, was used to reduce the balance due to the bank. He thought the Council would agree that the profit made was handsome, and that it was disposed of in the best way for the ratepayers. The coal carbonized during the year was 13,929 tons, against 13,659 tons the previous year. The gas made per ton of coal carbonized was 10,325 cubic feet, against 10,334 cubic feet. The total make of gas for the year was 143,814,000 cubic feet, as against 141,156,000 feet, or an increase of 1·86 per cent. Coal last year cost £7743, as against £7932 in the previous year. The residuals—coke, tar, and liquor—realized 58·62 per cent. of the cost of the coal, against 64·52 per cent. The discount, which was 5d. per 1000 cubic feet, amounted last year to £1715, against £1743 the preceding year. This showed that the ratepayers paid their accounts very promptly, because the figure named was almost the maximum discount that would have been allowed if all the accounts had been paid within the specified time. At the end of the year the amount owing in respect of gas sold was £412, against £273 at the corresponding period of the preceding year. This increase was owing to one or two large accounts remaining unpaid. He thought the Corporation were to be congratulated upon the year's working. Observing that he had now been Chairman of the Gas Committee for ten years, he reminded the Council that when he accepted the office the position of the gas-works was much debated. Some thought they had seen their day, and that it was necessary to build fresh works on a new site. He and others disagreed entirely with this view; and ultimately the Council were of their opinion. Ten years ago, the Corporation had less than half the present number of consumers. In March last, they had 5127 consumers; and the astonishing thing was that more than half (2839) used prepayment gas-meters. Ten years ago there were very few such meters let out. Slot meters must be popular, not only with the working classes, but with other classes as well. Ten years ago they carbonized 10,090 tons of coal, and made 9726 cubic feet per ton, compared with 10,325 cubic feet last year. This increase he attributed to the new retort-house and the plant erected in it. He next compared the make of gas ten years ago—98,141,000 cubic feet—with last year's make, and pointed out that there had been an increase of 46 per cent. The Gas Committee, he said, had been wise in keeping down the indebtedness of the Corporation in respect to their capital expenditure. They all knew that the money which the Act of Parliament allowed to be borrowed on the gas-works (£85,000) had been raised. During the last ten years, the Committee had spent £42,515 by way of capital. Of this, £12,265 had gone for new mains and meters, £716 for purchasing property adjacent to the works, and £29,534 had been expended upon the reconstruction of the works. Of the £42,515, only

£13,212 had been raised by way of mortgage. The balance (£29,303) had been paid partly out of revenue and partly by a loan from the bank, which was being rapidly extinguished. In the period of his chairmanship, a sum of £26,920 had been paid in relief of rates. He thought the ratepayers would be satisfied that they had a most excellent industrial undertaking. The works were thoroughly up-to-date, they were in excellent condition, and he believed they were second to none. To show how the Committee dealt with their accounts, he said they had spent in ten years about £5000 on cookers and stoves. This had been written down to such a sum that the value of these stoves and cookers in the balance-sheet was really less than they would obtain if they were to sell them for scrap-iron. He believed this had been a wise policy. He next referred with satisfaction to the alterations made in the method of collecting the accounts. Ten years ago the arrears in respect of gas were £1164; last March they were £412. The latter sum was owing in respect of sales which amounted to £17,854; whereas the £1164 owing ten years ago was in respect of sales of only £11,357. Ten years ago they paid on the gas undertaking £451 for rates and taxes; last year these amounted to £998. Of the £85,000 borrowed on the works, £64,954 was still owing. The sum of £20,042 had been repaid—£12,905 of it within the last ten years. He concluded with acknowledgments to his colleagues on the Gas Committee, and to the Manager (Mr. W. Prince), the staff, and the workmen.

EXPLOSION AT THE LICHFIELD GAS-WORKS.

An explosion occurred last Tuesday morning at the Lichfield Gas-Works, though happily with less serious results than might have been the case had it happened during the night. It appears that an escape of gas took place in the meter-house (where some alterations were being carried out), in consequence of the water in an hydraulic valve having evaporated, and that this gas became ignited at a jet photometer in the same building. Mr. Frederick Key, the Engineer and Manager, immediately shut off the holder valve in the governor-house near by; and a few buckets of water did the rest. Had it not been for the fact that, in the excitement of the moment, Mr. Key shut off every valve that he could see open (thereby, of course, stopping the town supply), no one but the Company would have heard anything of the matter; but as it was, some exaggerated reports of the accident got into the daily papers. Unfortunately, Mr. Key's face was slightly scorched, as the whole place burst into flame while he was looking at it, and before he had time to replace the water in the hydraulic valve; but he was, we are glad to learn, able to be present at a Board meeting the same afternoon, when he was congratulated by the Directors, both on his own account and theirs, that things were no worse. The man who was with Mr. Key at the time of the occurrence was less lucky, for he had his head and face badly burnt. It is, however, expected that he will be at work again in a few days.

GAS AND ELECTRIC LIGHTING IN ST. PANCRAS.

The accounts of the Electricity Department of the St. Pancras Borough Council for the year ending the 31st of March were issued on Tuesday. They show a net profit of £13,860 on the year's working, against £20,583 the previous twelve months. In the course of the report accompanying the accounts, it is stated that, with the view of combating the increased activity of the Gas Company, a canvasser has been engaged for the purpose of developing the business of the department, and premises have been acquired by the Council in the Camden Road for the purpose of displaying electrical fittings, arc lamps, heating and cooking apparatus, and other accessories. A special return shows the amount paid for gas for public lighting during the past eleven years, and also the payments for electric current since the commencement of the supply. For the year ending Lady Day, 1895, the average number of gas-lamps in use in the borough was 4312, the price per 1000 cubic feet of gas being 2s. 2d. and 2s. 3d., and the total amount paid £8839. For electric lighting, during the same period, 96 lamps were used, the price of current being 6d. and 5d. per unit, and the total paid £4426. In the past financial year, there were 2486 gas-lamps in use, the price of gas being 2s. 3d. and 2s. 2d. per 1000 cubic feet, and the total paid being £4846. In the portions lighted by electricity, 638 lamps were used; the charge for current for the first quarter being 3d., and for the remaining quarters 1½d. per unit—the total cost for the year being £10,851.

THE PLYMOUTH GAS COMPANY AND THEIR EMPLOYEES.

Fine weather prevailed on both the days set apart last week for the annual outing of the employees of the Plymouth and Stonehouse Gas Company; and the excursions proved as usual most enjoyable. The workmen were divided into two parties; and the first of the outings took place on Tuesday, when fourteen brakes were filled with the workmen and their wives, the party numbering in all about 280. Accompanying them were Sir Joseph Bellamy, the Chairman of the Company; Mr. T. Greek Wills and Mr. J. H. S. May, Directors; Mr. Percy S. Hoyte, the Engineer and Manager; Mr. W. Heath, the Secretary; and Mr. J. Paton, the Borough Engineer. The drive was first to Brent, where luncheon was served in a large marquee—Sir Joseph Bellamy presiding. Mr. John Walters, the foreman, proposed the toast of "The Chairman and Board of Directors," and, in the name of the workmen, thanked the Board for inviting them to spend that pleasant and enjoyable day together, and said they especially appreciated the thoughtfulness of the Directors in inviting old members of the staff. Mr. James Ward, the late foreman, in endorsing the latter remark, said the old servants of the Company were very thankful for the provision which had been made for their superannuation.

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Sir Joseph Bellamy said the Directors took no credit to themselves for providing for the old servants. They felt that the care of them was a duty; and it was one that they were pleased to perform. They desired the happiness of every man in their employ, and were prepared to do all they could for their comfort and well being. The only condition was that the men should be deserving, and work shoulder to shoulder with the Directors for the welfare of the Company. He thanked one and all for their co-operation during the past year. Mr. W. Ford remarked that nothing could be more encouraging than the words spoken by the Chairman. There was no firm in the district who did as much for their employees as the Gas Company; and he wished the Directors to know that the men thoroughly appreciated all that was being done for them. Mr. W. Hopkinson proposed a vote of thanks to Mr. Hoyte for the excellent arrangements made for the party, and referred to the good relations which existed between the Engineer personally and the staff. Mr. Hoyte, in reply, said this was the sixth year in which these outings had been held. From the time when Sir Joseph Bellamy became Chairman of the Company, a totally different feeling from that formerly prevailing had arisen between the Directors and the men. The relations now were most cordial. On the conclusion of the luncheon, the drive was resumed, and Modbury was reached in time for tea. In the evening the party drove home, thoroughly delighted with the excursion, much of the success of which was due to the excellent arrangements made by Mr. Hoyte. The second party on Wednesday followed the same route, and had an equally pleasant experience.

DIFFICULTIES OF AN ENGLISH WATER-WORKS COMPANY IN SPAIN.

An Ingenious Fraud.

Shareholders of the Seville Water-Works Company are passing through a period of difficulty, which is hoped and believed is only temporary. The troubles were the subject of considerable discussion at a meeting of extraordinary length yesterday week. After the Secretary (Mr. J. M. Hamilton) had read the notice convening the meeting, the report was presented. It announced that the income amounted to £31,817. After deducting working expenses, the cost of laying on services, and the interest on debentures, the net profit for the year was £4104, as compared with £5002 in the previous year. The unappropriated profit made the amount at the credit of profit and loss account £4906. A very regrettable matter had next to be dealt with, and this the Chairman and Directors felt very keenly. Certain irregularities in the cash were discovered in the Seville office during the year; and the amount, together with the expenditure incurred in connection therewith, has had to be placed to a suspense account, which the Directors proposed to charge against the balance, and to carry forward £95.

The speech of the Chairman (Mr. Cowley Lambert) put the position tersely before the shareholders. In the course of it, he said that it would be noticed there had been a small increase in the water-rental for the year, which showed that, if the Company were in a normal position, they might hope to be doing good business in Seville. The expenses had been fairly kept down; but the increase in water-rental had been more than swallowed up by the increase in taxation (some of which went back to previous years) and also in connection with the additional supply of water owing to the long-continued drought. In 1902, the rainfall amounted to 630 mm.; in 1903, it had dropped to 583 mm.; in 1904, it suddenly dropped down to 386 mm.; and this year it had dropped still further to 375 mm.—the average being 523 mm. From the action of the Central Government, it was clear that it was now recognized by them that there was a very great drought of long continuance over the land, and that the people were suffering to a very great degree. Now, by an order of the Governor of the province a few months ago, the Company had been compelled to take water from the Municipality, and to pay for it according to the order. It was the overflow water of the aqueduct. Of course, the Company were using the water—what there was of it; but the Directors had entered a formal protest against the Governor's order to pay for it. They believed he had no power to make such an order, because the Santa Lucia spring and aqueduct to Seville were the property of the Company, under the original concession granted many years ago, though up to now the Municipality had refused to hand it over to the Company. Further, the Municipality refused to hand over the water belonging to the Royal Palace, although the Alcalde himself had promised that this should be done; and formal application had been made by the Intendant of the Royal Palace in Madrid. The Municipality, however, still refused to hand over this water, although it belonged to the Company by virtue of the royal deed made in 1898. In September last, the Municipality passed a resolution not to pay their water-rate; and the Alcalde, by public notice, incited the people not to pay their rates. The Company at once instituted proceedings against the Alcalde, with the result that he paid his own rate; and nearly all the consumers who had refused to pay, as soon as their supply was cut off, paid theirs, and the Company then restored their supply. These things made it exceedingly difficult for the Directors to carry on the business successfully. There was, however, one piece of good news. The Company had won the lawsuit in the Supreme Court of Madrid in reference to the water known as Las Ascenas. This was a vexatious action brought by one of the millowners on the River Guadaira to prevent the Company from using the water of certain springs, which they had had for some time now as an additional supply. The success of the action was of immense importance to the Company. The Directors had endeavoured, to the best of their ability, to take every opportunity of increasing the supply of water. But with all their sources, they could not possibly supply the full amount of water to the people if the springs continued to dry up as they were doing now, because that was what it came to. The flow of the aqueduct itself was

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WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND IN ADDITION, 7,900,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

now decreasing, so that the Municipality would not have the water to give them, which they compelled the Company to take, and expected them to pay for. What made matters worse, the hot weather would continue for another two months at least.

Coming to the other misfortune which had befallen the Company, the Chairman said it was through the dishonesty of their late Cashier at Seville. Immediately he (Mr. Lambert) heard of this unfortunate occurrence, he requested the Auditors to send out two members of their staff to investigate the matter; and Mr. Wilson and himself were there within two or three days. After very careful inquiry in every direction, and into everything that could in any way enlighten them with regard to the fraud and its consequences, the only redeeming feature about it that they could find was that the fraud was committed by the Cashier alone. They were naturally anxious to trace the fraud itself, and to ensure the impossibility of the recurrence of such a thing; and they desired also to fix the responsibility of it upon somebody. But they had failed to do so. The fraud itself was so ingenious, and there was what he might call such "a chain of fortuitous circumstances" connected with it, that they had been unable to fix the responsibility on anyone but the Cashier himself. Of course, it was easy to be wise after the event; and possibly, if their Manager (Mr. Friend) had taken some course that he had not taken, the fraud would not have occurred, or it would have been discovered sooner. But the Directors were all of opinion, after going very carefully into the matter, that while there might be some blame attaching to the Manager, he could not be held responsible for the fraud.

The resolution adopting the report was then moved by the Chairman, and seconded by Mr. F. S. Jackson, after which Mr. C. C. S. Fooks, Mr. Evans, Count Torre-Diaz, Mr. Capron and other shareholders applied themselves very zealously to interrogating the Chairman and the representative of the Auditors (Messrs. Deloitte, Dever, Griffiths, and Co.) upon the question of the frauds. Two or three of the principal points elicited can only be mentioned. The frauds it seems dated back as far as ten years ago. They were discovered on the confession of the Cashier himself, who, having got to a certain point, found he could not carry on his fraud any longer, and was compelled to confess to Mr. Friend. The embezzlement took place in this way: Month after month the Cashier got the Bank to place to the credit of one month money received during the first half of the following month. The end of the Company's financial year was March 31; and money received by the Cashier a week or two after March 31 was paid by him into the Bank, and entered by the bankers as received prior to that date. The Cashier also entered receipts during the first weeks of each month in his cash-book as having been received during the previous month; and therefore his cash-book and the pass-book corresponded. The bankers also gave the Auditors a certificate which certified that, on March 31, a balance existed, which did not in fact then exist. In other words, they included in the figure they certified as existing on March 31, sums of money which were paid to them during part of April. It seemed an extraordinary affair that the bank should so certify; but it appeared that some years before the Manager requested the Bank to keep the account open for two days on the occasion of a fête at the end of March, when it was impossible to pay money into the bank. The Cashier took advantage of this; and, on his authority, the practice was continued, and thus for some years he was able to cover his defalcations. If, of course, the bank had given the Auditors a certificate of the actual balance on March 31, the fraud would have been detected at once; or if they had entered the money in the pass-book each day as received, it would also have been detected. Counsel (Mr. Younger) had, it was mentioned, given an opinion adverse to taking action against the bank. The whole of the late Cashier's property, including shares in mines, had been made over to the Company; and it was hoped by the Directors that eventually there would be a full recovery of the losses—the total amount of which was £4810 18s. 3d.

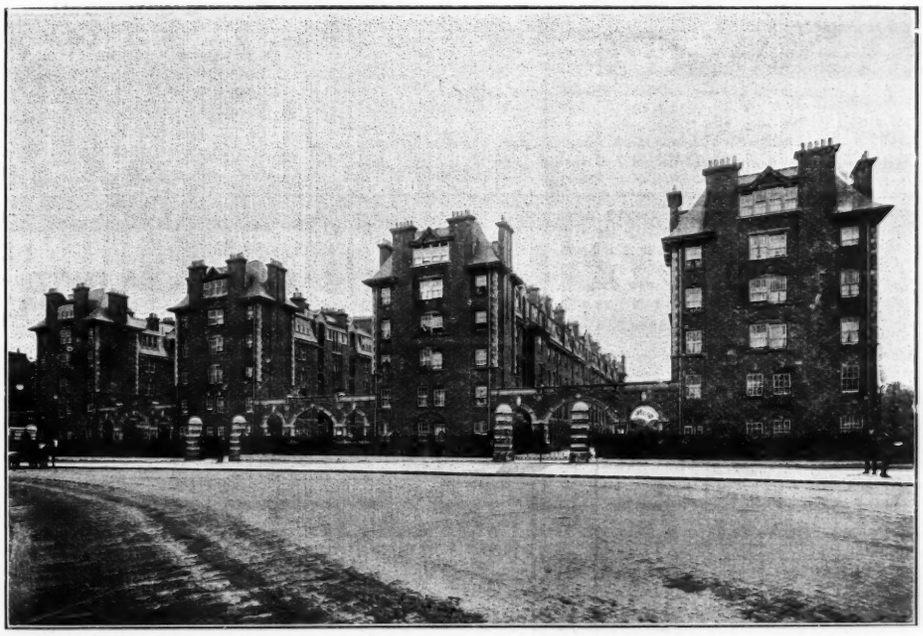
Ultimately, the report and accounts were adopted; and then the shareholders passed a resolution expressing their great dissatisfaction with the laxity of supervision at Seville. At the same time, speakers acknowledged the eminent services that Mr. Friend had rendered to the Company. The retiring Directors (Mr. Easton Devonshire and Mr. Cowley Lambert) were re-elected. But an effort which was subsequently made to displace the Auditors failed; and they were reappointed. A vote of thanks was passed to the Chairman and Directors—their frankness in giving information on the questions of the difficulties being acknowledged, together with expressions of regret that their burden of trouble had been supplemented in this way.

THE "LANCET" ON THAMES WATER.

The following article on the subject of the suitability of Thames water for human consumption appeared in the "Lancet" on Friday.

No one can hold for a moment that the Thames is an ideal source of water supply; but it is a very grave indictment to say that the water at its best is diluted sewage. It is against the highest conceptions of public health that a river which serves as the channel for conveying the sewage of the Metropolis away out of sight should be also the source of most of the water supplied to the Metropolis for drinking purposes. And matters are not likely to grow better, for the population is increasing, which means that while more water will be wanted the output of sewage will be greatly increased. The introduction of bacteriological processes for the disposal and complete destruction of sewage, it is true, promised results compatible with hygienic requirements; but, remarkably efficient in breaking down putrescible matters as the bacterial agencies appear to be, we have it on the greatest authority that there is no decisive evidence that these agencies will destroy pathogenic entities. It is admitted that London water drinkers are at the mercy of the filter-beds. If these should fail, the chances of the outbreak of disease are great; and a water-

INSTALLATIONS.



NOTES:

11 miles of Piping used.

1200 Points fitted.

310 Cookers fixed.

310 Meters fixed.

LONDON—Navarino Mansions—END VIEW.

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borne disease in London would be too terrible to contemplate—threatening the lives not of thousands, but of millions.

The evidence, however, that the water supply of London has been accountable for disease is not convincing; and we are not aware that any difference has been shown to exist as regards the prevalence of disease between those who drink water derived from the Thames and those who drink (say) the deep well waters of the Kent division supply. At all events, there can be little doubt that the abandonment of a supply derived from a river which is admittedly used for the carriage of sewage in favour of the adoption of a supply from the pure and abundant watershed of Wales would inspire a feeling of considerable confidence amongst London water drinkers, and would confer indisputable advantages also in many other directions. It should not be forgotten, however, that the acquirement of a fresh source of water supply for the Metropolis would mean not only a purer water for drinking purposes, but a supplementary supply for ultimate discharge into the river which would augment the volume flowing to the sea, and necessarily tend to keep it in a less contaminated condition. The subject has been approached recently by Dr. W. Scott Tebb, the Public Analyst of the Metropolitan Borough of Southwark, who, in a paper that has reached us, concludes:—

1.—That five out of the seven Commissions or Committees of Inquiry which have investigated the quality of the Thames water have condemned the river as a source of domestic supply to the Metropolis.

2.—That the quality of the water as indicated by the analyses has shown no substantial improvement during the last thirty years.

3.—That the river and its tributaries are at the present time extensively polluted by sewage, sewage effluents, foul house refuse, and other obnoxious matters.

4.—That it is doubtful if this excessive pollution can ever be prevented, especially in times of flood, from gaining access to the river.

5.—That there is no reason to suppose that the poison of cholera or typhoid can be eliminated from drinking water by any practicable process of purification such as filtration.

Serious as are these conclusions, they are made all the more serious by the contemplation that the water areas of England and Wales are likely to be acquired by local provincial towns, and that therefore year by year the prospect of gaining a new and adequate source of water supply for London becomes less certain.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

On Thursday I spent hours in the Town Council of Glasgow awaiting the consideration of the report of the Gas Committee and the accounts of the Gas Department for the year ending May 31. Owing to July being the holiday month in Glasgow, Town Council business has a habit of falling into arrear, with the result that the meetings in August are overburdened with work. This was the case on Thursday. The gas business was nineteenth on the list. Just before five o'clock, when there were still seven items intervening, Mr. T. Calderwood, the Convener of the Gas Committee, rose and said it was imperative that the minutes and accounts should be considered; and he asked that they be taken up then. The Chairman for the time being—Bailie G. Mitchell—having taken the sense of the Council upon the subject, decided that the minutes should be taken up—the accounts to be left over. On the rubric of the first item being read—that which proposes to charge a differential price for gas consumed for motive power and manufacturing purposes—Bailie P. G. Stewart said that while he did not wish to obstruct in any way, he wanted to discuss the charges proposed, and, at that time of day, he thought it would be very much better that the recommendation should be held over. Mr. Calderwood expressed himself as quite agreeable, but pressed that the minutes, so far as not relating to the accounts, should be adopted. This is understood to have been agreed to; but the sitting came to an abrupt end—a count out, which proved to be successful, having been called for just before five. Whatever may be the Town Clerk's view with regard to the minutes of the Committee, the report and accounts have not been adopted; and I am not in a position to do more than refer to them, because, until they pass the Council, they are not issued. I can say little more than that the revenue from the sale of gas was £800,177. There is a deficit on the year's working of £12,055; but this is considered most satisfactory, in respect that a much larger deficit was estimated for than has been realized. This policy was adopted on account of a credit balance of £33,081 having been carried forward a year ago, which it was intended to wipe out to a greater extent than the department have been able to do. The year has been a splendid one for the department, which will be realized when the report and accounts become available for publication.

At the Dunfermline Town Council on Monday, the Gas Committee recommended that the price of gas used in gas-engines should be reduced by 3d. per 1000 cubic feet. The recommendation was agreed to.

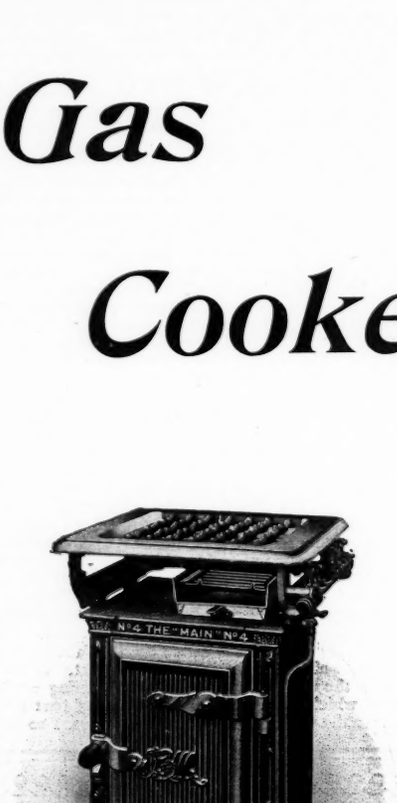
A system of public lighting has been fitted up by the Corporation of Dalkeith upon terms which most people are agreed might be improved upon. It is now proposed by the suppliers of the light—the Electric Supply Corporation, Limited—to erect Nernst all-night lamps on the alternate arc lamp columns; these to be lighted when the arc lamps are put out for the night. The Corporation are agreeable to pay £2 for each lamp per annum, the Company to fit up the plant and to maintain it. In addition to this proposal, a Committee have submitted a scheme for the lighting of the closes and less important streets in the town by electricity, the cost of which, including the laying of the mains, would be £2 7s. 6d. per annum for each light. The Town Council have requested the Dalkeith Gaslight Company to estimate for the lighting of these places by gas for periods of three and five years, before they dispose of the recommendations of the Committee.

The accounts of the Gas Department of the Corporation of Perth have been made up and circulated among the members of the Town

The "MAIN"

Gas

Cooker



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LONDON, GLASGOW, FALKIRK, BRISTOL, MANCHESTER,

BIRMINGHAM, AND BELFAST.

Council. They show that the revenue amounted to £34,016, and the expenditure to £22,677; leaving £11,339 to be carried to the net revenue account. The payments from this account, including annuities, sinking fund, taxes, and reserve fund, and £250 applied to depreciation of gas-stoves, amounted to £11,424. There is a balance of £6125 at the credit of the sinking fund. Of the reserve fund of £9721, there has been applied, in payments towards purifiers, dismantling old works, damage through fire, expenses of borrowing, contingency, and for new retort-settings, £6091; leaving a balance at credit of £3633. The balance-sheet shows assets amounting to £248,359, and liabilities £213,332, which makes a surplus of £35,027 of assets over liabilities. The quantity of gas made during the year was 192,657,000 cubic feet, which was an increase of 5½ million cubic feet. In the year preceding, there was an increase of 14 millions. The revenue from the sale of gas amounted to £27,596; from gas-stoves, £465; from tar, £2961; and from sulphate of ammonia and green tar, £2929. The net price of gas is brought out at 3¾d. per 1000 cubic feet. The Town Council on Thursday night resolved to reduce the price of gas from 3s. to 2s. 10d. per 1000 cubic feet. This is the lowest price at which gas has ever been sold in Perth. The price was reduced by 2d. per 1000 feet a year ago.

At the monthly meeting of the Dunfermline District Committee of the Fife County Council on Tuesday, it was reported that the Public Health Committee had approved of the recommendation made by the local Committee, that the offer of the Kelty Gaslight Company be accepted, to furnish gas, to light and extinguish the public lamps, and to maintain the lamps, for £175 per annum, for a period of three years. The District Committee approved of the recommendation, and agreed to provide 110 lamp-posts at a cost of £275.

Mr. S. Millar, Manager of the Lockerbie Corporation Gas-Works, having tendered his resignation, the Town Council have agreed to advertise for a new Manager.

It is announced that the shareholders of the Monifieth Gas Company at their meeting on Wednesday agreed to accept the offer of the Town Council for the transfer of their undertaking. Some time ago the works were valued on behalf of the Town Council; and the offer which the Council made was based upon that valuation. The Directors of the Company recommended acceptance of it. It is anticipated that the amount offered will be sufficient to repay the shareholders of the Company their capital in full, with 5 per cent. interest, and compound interest since the date of the investments. The Company are only a few years old. The Council take over the whole of the Company's assets, which include the works, plant, implements, a large piece of vacant ground, the piping throughout the burgh, money in hand, book debts, &c. The community, by a special plebiscite, some time ago gave the Town Council authority to promote the transfer.

The Gas Committee of the Dunfermline Town Council have agreed to recommend that the price of gas to ordinary consumers for public lighting and for cooking and heating be retained at 2s. 9d. per 1000 cubic feet; that for gas consumed through prepayment meters the price be retained at 3s. 4d.; and that for motive power it be reduced from 2s. 6d. to 2s. 3d.

COAL TRADE REPORTS.

Lancashire Coal Trade.

Well off as East Lancashire is in the matter of coal supplies, the force of competition has resulted in some East Lancashire users concluding contracts with West Lancashire and some Yorkshire collieries. Except in house coal, trade is steady; but slack is very scarce. Engine fuel is in fair demand. The practice of railway companies in charging demurrage for standing full coal-waggons is proving troublesome to coal merchants, who are afraid to buy except for small consignments. Should the present trouble between cotton operatives and their employers result in a strike, hundreds of mills will be closed and no coal wanted. At this prospect, coalowners seem somewhat indifferent. It is hoped, however, that either the 5 per cent. increase in wages asked for will be granted or a compromise effected.

Northern Coal Trade.

There is a steadier demand for coal; and the general consumptive requirements seem now to be enlarged, with perhaps one exception. The steam coal trade is active, and the tendency is for the present towards firmer prices; while the collieries seem to be better employed than they were. Best Northumbrian steams are from 9s. 4½d. to 9s. 6d. per ton f.o.b., second-class steams are 8s. 3d. to 8s. 6d., and steam smalls are from 4s. 9d. to 5s. 9d. Gas coals now show some increase of the needs of the great companies; many of which begin with the current month, when the sea freights are still low, to increase their stocks. The demand is now larger, and may be expected to grow week by week almost for some time to come. Prices of Durham gas coals vary with the quality from about 7s. 9d. up to about 8s. 6d. per ton f.o.b. The best qualities seem to be the firmest in price, possibly because they are usually well contracted, and the quantities under these contracts are growing. Coke is firm in general; and the limited supplies of gas coke put on the market at present keep it steady for shipping purposes at last week's quotation. Some inland-made gas coke is scarcely so firm.

Scotch Coal Trade.

There is a slightly better tone in the market, which arises chiefly from an improved demand for shipping; but there is a better inquiry also for home purposes. Splint is plentiful, and is being pressed for sale. The prices quoted are: Main 7s. 3d. to 7s. 6d. per ton, f.o.b. Glasgow, ell 8s. to 9s., and splint 8s. 6d. to 8s. 9d. The shipments for the week amounted to 218,625 tons—an increase of 74,479 tons, upon the preceding week, and of 5725 tons upon the corresponding week of last year. For the year to date, the total shipments have been 6,776,399 tons—an increase of 401,945 tons upon this period of 1904.

THE

PARKINSON "CROWN" COOKER

SHOWING HOT-PLATE

HINGED TO FACILITATE

CLEANING OF BURNERS, &c.

PARKINSON AND W. & B. COWAN, LTD.
(*Parkinson Branch*),
COTTAGE LANE, CITY ROAD, LONDON.
BELL BARN ROAD, BIRMINGHAM.

CURRENT SALES OF GAS PRODUCTS.

Week ending Aug. 5.

There has been very little business doing in the London market during the week, and practically no alterations in prices have taken place. The actual inquiry for pitch has not been very good; but the price remains firm. 90 per cent. benzol would not be sold at less than 9½d. per gallon net; but for 60's crude carbolic, probably 1s. 9d. would now have to be taken. Ordinary London creosote remains without change at 1¾d. per gallon; and there does not appear to be very much to be had at this figure. Sulphate of ammonia, notwithstanding the rather limited inquiry, is, if anything, slightly firmer.

Sulphate of Ammonia. LIVERPOOL, *Aug.* 4.

The market has been very quiet, and prices are again easier at all points; the closing quotations being £12 2s. 6d. per ton f.o.b. Hull, and £12 5s. f.o.b. Liverpool and Leith. Supplies are not great; but in the absence of fresh Continental and Spanish demand, other requirements have been barely enough to sustain prices. There continues to be good inquiry for delivery ahead, but the ideas of buyers are scarcely above spot prices; while makers look for 5s. to 7s. 6d. per ton more, according to position.

Nitrate of Soda.

This article is quiet at 10s. to 10s. 3d. per cwt., according to quality, on spot; and the Continental market has recovered somewhat from the recent demoralization.

Tar Products. LONDON, *Aug.* 5.

There is certainly more business doing, and, as a rule, inquiries from the Continent are more numerous. The market for benzol is decidedly strong; and a large business has been done in 50-90 per cent. at prices varying from 8¾d. to 9¼d.—in fact, it is reported that in one instance as much as 9⅜d. was paid for August-October delivery. In 90 per cent., there is very little offering; but London makers are reported to have declined 9½d. for early delivery. In the North, distillers are firmer in their ideas, and ask prices equal to 9⅜d. for prompt; while they decline to quote for forward delivery. A very large business is reported in toluol during the past week at the parity of 8¾d. to 9d. for August-September delivery. Solvent naphtha is still in very good demand, both for home consumption and for export; and some makers report having made sales at as high as 9d. for ordinary 90 per cent. at 160°, although there are still sellers at rather under this figure in the North. In anthracene, there is nothing fresh to advise; and in the absence of business, prices remain purely nominal. Carbolic acid is certainly weaker, as consumers are holding off the market, and, as a rule, are not offering more than 1s. 8d. per gallon for 60's in any position. Makers, however, do not appear particularly anxious to sell for forward delivery; and as there are practically no stocks, it is difficult to see why any material fall in value should take place, as the demand for crystals is good, and German makers report having done a large business at the parity of 6¼d. for 39-40 per cent. There is very little business doing in creosote, as the principal London makers decline to reduce their quotations, and are still asking 1¾d.; while as regards the smaller producers, consumers will not at present entertain business in the very salty oil, even at 1½d. Yorkshire makers report sales at 1⅝d. for forward delivery; but in Lancashire and the Midland districts, there is an absence of business. In pitch, the position is practically unchanged, and consumers do not appear at present open to purchase for early delivery—the Continental briquette makers being as a rule fairly well supplied for delivery over the current year. In South Wales, there are buyers over the first six months of next year; but the prices offered are so very low that dealers and distillers decline to entertain same. As regards the Lancashire district, there has been no business to report, but undoubtedly makers are desirous of selling in several instances. The largest London producers still quote 29s., at which price, however, it is not possible to arrange business; while in Yorkshire, distillers are showing more desire to sell for October-December delivery, although at present they ask prices which buyers decline to pay.

The average values during the week were: Tar, 16s. to 21s. Pitch, London, 28s. 6d. to 29s.; east coast, 28s. to 28s. 6d.; west coast, 25s. 6d. to 26s. **Benzol, 90 per cent.**, 9¼d. to 9⅜d.; **50-90 per cent.**, 9d. to 9⅛d. **Toluol**, 8⅝d. to 9d. **Crude naphtha**, 3⅛d. to 3⅜d.; **solvent naphtha**, 8⅝d. to 8¾d.; **heavy naphtha**, 10d. to 10½d. **Creosote, London**, 1 $\frac{9}{16}$d. to 1 $\frac{11}{16}$d.; North, 1¼d. to 1⅜d. **Heavy oils**, 2d. to 2 $\frac{1}{16}$d. **Carbolic acid, 60 per cent.**, 1s. 8½d. to 1s. 9d. **Refined naphthalene**, £4 to £4 10s.; salts, 12s. 6d. to 14s. **Anthracene**, "A" quality, 1⅛d. to 1⅜d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market has been very quiet during the past week, and there has been very little business doing. At Beckton, the nominal price is £12 10s.; but business is not possible at this figure at present. The South Metropolitan Company also ask £12 10s. on their own special terms, and are reported to have declined business at a little under this for early delivery. Several sales have been made in Leith during the past week at £12 5s. for August shipment. In Hull, there is no business of importance to report. The nominal price may be taken as £12 2s. 6d., although for forward delivery makers do not seem inclined to accept this figure. The market is quiet at Liverpool, and there is no business of any importance to report.

Fatal Accident to a Gas Manager's Wife.—As the result of a terrible accident, Mrs. Lister, the wife of Mr. Walter Lister, the Manager of the Porthcawl Gas-Works, recently met with her death while cycling on the road to Aberavon. The evidence given at the inquest showed that deceased, when turning a corner, dashed into a brake, one of the back wheels of which went over the machine. A verdict of "Accidental death" was returned.

THE

MAXIM PATENT

CARBURETTOR

For Enriching Gas in Bulk.

Prevents Naphthalene Deposits.

OVER . . . . .

120

MAXIM PATENT CARBURETTORS

HAVE NOW BEEN FIXED.

Among the Companies and Towns supplied are The Gaslight and Coke Company, Manchester, Exeter, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Oldham, Dundee, Perth, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past **Ten Years.**

More Gas and Saleable Coke per Ton of Coal Carbonized is produced; saving Capital, Labour, Fuel, Wear and Tear, &c.

THE ENRICHMENT IS INSTANTANEOUS AND PERMANENT.

The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.

DEALERS IN

Benzol, Carburine, and all other Naphthas and Oils suitable for the Enrichment or Production of Gas.

For Prices and full Particulars, apply to the

Gas Lighting Improvement Co.

LIMITED,

18, Devonshire Street,

BISHOPSGATE, LONDON, E.C.

New Water Supply for Woolacombe and Mortehoe.—There was a large gathering last Wednesday on the occasion of the public inauguration of the new water supply for Woolacombe and Mortehoe, two neighbouring watering places on the North Devon coast. The supply is obtained from the works of the Ilfracombe District Council on Exmoor, powers having been given to the Council in their last Water Act to supply these places. The work has been carried out by the Ilfracombe Council at a cost of about £7000, and has involved the laying of five miles of 8-inch, 6-inch, and 4-inch mains. This work has been hurried with a view to providing water for the present season; but it is intended to construct filter-beds and a service reservoir with a capacity of 100,000 gallons, the contract for which has already been let. Mr. Davie, the Chairman of the Barnstaple Rural Council, in whose district the villages of Mortehoe and Woolacombe are situated, turned on the new supply. He congratulated the villages on the wisdom and energy they had displayed in obtaining it, and also those who had carried out the work and had achieved what he thought must be a record for water-pipe laying. They had now a water supply equal to any in England. A silver cup was presented to Mr. Davie as a memento of the occasion. Filling it with water he drank to the prosperity of Mortehoe and Woolacombe. Several speeches were made, including one by Mr. J. C. Clarke, the Chairman of the Ilfracombe District Council, who said that since Ilfracombe had had its new water supply the death-rate had decreased.

Owing to the dearth of water in Paris, the supply is being cut off each midnight for five hours. It is reported that the present condition of affairs is largely due to reckless waste.

The Newbury Town Council have resolved to make application to the Local Government Board for sanction to a loan of £2500, to cover the balance of the cost of a new gasholder, extensions of mains, and new fencing at the gas-works.

The Mirfield Gas Company have decided to apply to Parliament next session for further powers and additional capital. There has been a growing demand for gas in the district; and to meet it certain extensions of the works are necessary.

We have received a copy of a reprint from the "Mining Journal" of a description of the pumping engines supplied by Messrs. Hathorn, Davey, and Co., Limited, of Leeds, for the Tasmania Gold Mine. The plant is divided into three units, each of which, when completed, will consist of a steam-engine placed upon the surface, actuating four pairs of plunger pumps fixed in the shaft, raising the water 2000 feet in four stages. The engines are of the compound differential condensing type for which Messrs. Hathorn, Davey, and Co. are well known, but of unusually large size, and built for a steam pressure of 150 lbs. Each engine has a low-pressure cylinder 108 inches in diameter, and a high-pressure one 50 inches in diameter, each having a stroke of 10 feet. The first unit has been at work since February.

During the recent visit of the Institution of Mechanical Engineers to the Liége Exhibition, attention was called by some of the members to the method adopted in certain parts of the Continent of fixing large water-tanks to tall factory chimneys, at some distance from the ground—in fact, making the chimney act as a tower for the tank, in addition to fulfilling its own duties as a draught-producer, &c. These tanks, though practically unknown in this country, are fairly common in America and on the Continent of Europe. They are made of steel, annular in form, and are generally supported by the chimney by means of corbels at a point about one-third or one-half the height of the chimney from the ground. For many purposes the practical value of this method of fixing tanks is manifest, inasmuch as the cost of a special tower to carry the tank is avoided; and if the tanks are not placed too high, and care is taken in their design, they add somewhat to the stability of the chimney. We learn that Messrs. Heinrich and Co., of Brynmawr Road, Battersea Park, S.W., make a speciality of these tanks and chimneys.

WANTED, FOR SALE, CONTRACT, &c. ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

TEACHER GAS MANUFACTURE CLASSES. Birmingham Municipal Technical School.
TRAVELLERS (GAS METER). No. 4427.
GENERAL WORKING FOREMAN. Whitehaven Gas Company.
FOREMAN MAIN AND SERVICE LAYER. Hereford Gas Works.
GASFITTER AND MAIN LAYER. Brecon Gas Company.

Situation Wanted.

WORKING MANAGER OR FOREMAN. No. 4444.
FITTER. H. G., John Street, Gray's Inn Road, W.C.

Company Meetings.

BARNET GAS AND WATER COMPANY. Albion Tavern. Aug. 25. 12.30 o'clock.
BROMLEY CONSUMERS' GAS COMPANY. Bromley. Aug. 10. Six o'clock.
NORTH MIDDLESEX GAS COMPANY. London Office. Aug. 23. 3.30 o'clock.
SOUTHGATE GAS COMPANY. London Office. Aug. 24. 3.45 o'clock.

Stocks and Shares.

NEW CONVEYOR COMPANY.

TENDERS FOR

Brass Cocks, &c.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.

Coal and Cannel.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.
HOLYHEAD AND NORTH WALES GAS AND WATER COMPANY. Tenders by Aug. 20.
SHEFFIELD GASLIGHT COMPANY. Tenders by Aug. 16.

General Stores, Shovels, Oil, Gaskin, Iron and Steel, Glass, &c.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.

Lamps and Lamp Irons.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.

Lime.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.

Meters.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.

Pipes and Castings.

BRADFORD GAS DEPARTMENT. Tenders by Aug. 31.

Oxide of Iron.

BIRKENHEAD GAS DEPARTMENT. Tenders by Aug. 10.
SALFORD GAS DEPARTMENT. Tenders by Aug. 17.

Pumping Machinery.

SELBY WATER DEPARTMENT. Tenders by Aug. 28.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 369.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Apl. 13	10½	Alliance & Dublin 10 p.c.	20½—21½	..	4 17 8
160,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	May 12	6½	Bombay, Ltd.	6½—7	..	4 12 10
140,000	5	,,	6½	Do. New, £4 paid	5—5½	..	4 14 6
50,000	10	Mch. 15	14	Bourne-mouth Gas and Water Pref. 10 p.c.	29½—30½	..	4 11 10
251,810	10	,,	7	Do. B 7 p.c.	16½—17½	..	4 0 0
53,200	10	,,	6		15⅝—16⅝	..	3 12 9
380,000	Stk.	Feb. 24	12½†	Brentford Consolidated	248 - 253	..	4 18 10
300,000	,,	,,	9½†	Do. New	188—193	..	4 18 5
50,000	,,	,,	5	Do. 5 p.c. Pref.	127—132	..	3 15 9
206,250	,,	June 15	4	Do. 4 p.c. Deb.	103—106	..	3 15 6
220,000	Stk.	Mch. 15	11	Brighton & Hove Orig.	225—230	..	4 15 8
246,320	,,	,,	8	Do. A. Ord. Stk.	165—170	..	4 14 2
460,000	20	Mch. 30	10	British	41—42	+1	4 15 3
100,000	Stk.	Feb. 24	6	Bromley, Ord. 5 p.c.	120—125	..	4 16 0
165,700	,,	,,	4½	Do. do. 3½ p.c.	90—94	..	4 15 9
500,000	10	May 12	7	Buenos Ayres (New) Ltd.	11¾—12¼	+¼	5 14 3
250,000	Stk.	June 29	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
150,000	20	July 13	8½	Cagliari, Ltd.	24—26	..	6 6 11
100,000	10	May 31	10	Cape Town & Dis., Ltd.	17—17½	..	5 14 3
100,000	10	Apl. 28	4½	Do. 4½ p.c Pref.	10—10⅝	..	4 5 9
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	June 29	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,100,000	Stk.	Feb. 24	5⅛	Commercial 4 p.c Stk.	116—119	..	4 7 4
560,000	,,	,,	5	Do. 3½ p.c. do.	112—115	..	4 6 11
450,000	,,	June 15	3	Do. 3 p.c. Deb. Stk.	85—87	..	3 9 0
800,000	Stk.	,,	6	Continental Union, Ltd.	107—112	..	5 7 2
200,000	,,	,,	7	Do. 7 p c Pref.	137—142	..	4 18 7
424,070	Stk.	Feb. 18	3½	Derby Con. Stk.	124—126	..	4 7 4
55,000	,,	June 3	4	Do. Deb. Stk.	108—110	..	3 12 9
486,090	10	July 28	11	European, Ltd.	21½—22½*	..	4 17 9
354,060	10	,,	11	Do. £7 10s. paid	14½—15½*	..	5 6 5
15,223,235	Stk.	Feb. 10	4¼	Gas-light 4 p.c. Ord.	100—102	+2	4 6 3
2,600,000	,,	,,	3¾	light 3½ p.c. max.	91—93	−1	3 15 3
3,799,735	,,	,,	4	and Coke 4 p.c. Con. Pref.	109—111	..	3 12 1
4,193 975	,,	June 15	3	Coke 3 p.c. Con. Deb.	88—90	..	3 6 8
258,740	Stk.	Mch. 15	5	Hastings & St. L. 3½ p.c.	100—103	..	4 17 1
70,000	10	Apl. 28	11	Hongkong & China, Ltd.	18—19	..	5 15 9
3,800,000	Stk.	May 12	10	Imperial Continental	211—214	..	4 13 6
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Mch. 15	6	Lea Bridge Ord. 5 p.c.	120—125	..	4 16 0
561,000	Stk.	Feb. 24	10	Liverpool United A	226—228	..	4 7 9
718,100	,,	,,	7	Do. do. B	167½—168½	..	4 3 1
306,083	Stk.	June 29	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	,,	5	Malta & Medn., Ltd.	4—4⅛	..	5 11 1
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb.	102—104	..	4 16 2
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	May 31	3½	Monte Video, Ltd.	11—12	..	5 16 8
1,565,892	Stk.	Feb. 24	4½	Newc'tle & G'tesh'd Con.	108—109	..	4 4 10
466,625	Stk.	June 29	3½	Do. 3½ p.c. Deb.	92—93	..	3 15 3
15,000	10	Feb. 24	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	1	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	May 12	8	Oriental, Ltd.	145—148	..	5 8 1
600,000	5	Mch. 30	7	Ottoman, Ltd.	6—6½	..	5 12 0
168,255	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6	Primitiva Ord.	5½—6	..	5 0 0
796,980	5	July 28	5	Do. 5 p.c. Pref.	5½—5¾*	+⅛	4 10 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	96—98	..	4 1 8
851,070	10	Apl. 28	7	River Plate Ord.	12½—13	+¼	5 7 8
300,000	Stk.	June 29	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
250,000	10	Apl. 13	7	San Paulo, Ltd.	12⅞—13¼	..	5 5 8
70,000	50	July 1	5	Do. 5 p.c. Deb.	51—53	..	4 14 4
135,000	Stk.	Mar. 15	10	Sheffield A	237—239	..	4 3 8
209,984	,,	,,	10	Do. B	237—239	..	4 3 8
523,498	,,	,,	10	Do. C	237—239	..	4 3 8
123,998	Stk.	Mch. 30	5	Shrewsbury Ord. 5 p.c.	107—110	..	4 10 11
70,000	10	May 31	10	South African	15¼—16¼	..	6 1 3
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	130—133	+1	4 2 8
1,832,700	,,	July 13	3	Do. 3 p.c. Deb.	89—91	..	3 5 11
575,000	Stk.	Feb. 24	5½	S'th Suburb'n Ord. 5 p.c.	121—124	..	4 8 9
60,000	,,	,,	5	Do. 5 p.c. Pref.	125—130	..	3 16 11
112,533	,,	July 13	5	Do. 5 p.c. Deb. Stk.	127—132	..	3 15 9
502,310	Stk.	May 12	5	Southampton Ord.	107—110	..	4 10 11
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Feb. 24	6¼	Tottenham and Edmonton A 5 p.c.	125—128	..	4 17 8
338,020	,,	,,	4¾	B 3½ p.c. 4 p.c. Deb.	98—101	..	4 14 1
125,000	,,	June 23	4		105—108	..	3 14 1
182,380	10	June 15	8	Tuscan, Ltd.	9½—10	..	8 0 0
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Feb. 24	7½	Wandsworth A 5 p.c.	163—168	..	4 12 3
255,636	,,	,,	6¼	B 3½ p.c.	135—140	..	4 9 3
60,000	,,	,,	5⅛	and C 3½ p.c.	114—116	..	4 13 6
57,564	,,	June 29	3	Putney 3 p.c. Deb. Stk.	80—85	..	3 10 7
745,872	,,	Mch. 15	5	West Ham 5 p.c. Ord.	102—104	..	4 16 2
185,000	,,	,,	5	Do. 5 p.c. Pref.	123—126	..	3 19 4
193,300	,,	June 29	4	Do. 4 p.c. Deb. Stk.	104—109	..	3 13 5

† Next dividend will be at this rate. Prices marked * are "Ex div."

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

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O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

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JOHN WM. O'NEILL,
Managing Director,
PALMERSTON HOUSE, LONDON, E.C.

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"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

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THE South Metropolitan Gas Company are always open to receive OFFERS of SPENT OXIDE.
Chief Office: 709, Old Kent Road, London, S.E.
Telegrams: "METROGAS, LONDON."

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PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
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Offices: Commercial Buildings, LEEDS.
Correspondence invited.

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Finsbury, E.C. *Telegrams:* "RAGOUT," LONDON. *Telephone:* 273 CENTRAL.
SULPHATE PLANT—See Advt. in last week's issue.
CHARGING MACHINERY—See Advt. in this week's issue.
SATURATORS—See Advt. in next week's issue.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

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JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

GLASS SHADES of every description,
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Illustrated sheets on application.
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National Telephone: No. 63.
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SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO, LTD., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
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SPENT OXIDE PURCHASED IN ANY DISTRICT.

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Apply to E. PADFIELD AND CO., 96 & 98, Leadenhall Street, LONDON, E.C.

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JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
Telegrams: "ENAMEL." National Telephone 1759.

FITTER wants Job. Well used to Automatic Installations, Steam or Hot Water. Highest References.
Address H. G., 6, John Street, GRAY'S INN ROAD, W.C.

SITUATION wanted as Working MANAGER of small Works, or FOREMAN of medium Works. Thoroughly conversant with all latest Methods of Manufacture and Distribution. Twenty Years' Experience as Manager. Excellent Testimonials.
Address No. 4444, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS-FITTER and Main and Service- Layer Wanted at once.
Apply, stating Age, Experience, and present Engagement, together with recent Testimonials, to W. A. WRIGHT, Secretary, Gas Company, BRECON.

TRAVELLERS wanted for North of England and the Midlands. Good men wanted. Preference given to those having previous Experience and a Connection among buyers of Gas-Meters in their respective districts.
Apply, by letter, to No. 4427, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BIRMINGHAM MUNICIPAL TECHNICAL SCHOOL.

APPLICATIONS are invited for the post of TEACHER of Evening Classes in GAS MANUFACTURE.
For Particulars and Form of Application, apply to the SECRETARY.
July 27, 1905.

WANTED, an experienced and capable FOREMAN MAIN AND SERVICE LAYER.
Apply, by letter, stating Age, Experience, present or last Engagement, and Wages required, together with *copies* of Two recent Testimonials, to Mr. WILLIAM PARLBY, Engineer and Manager, Gas-Works, HEREFORD.

WANTED by the Whitehaven United Gas Company, Limited, a GENERAL WORKING FOREMAN for a Works making about 55 Millions. Must understand Generator Furnaces, Manufacture of Sulphate of Ammonia, be capable of Taking Charge of the Works in the absence of the Manager, and be a reliable man. Total abstainer preferred. Salary £90 a Year.
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(NATURAL.)

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SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
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(with which is amalgamated WM. PEARCE & SONS, LTD.),
36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341, AVENUE.

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Best Prices paid.
DENT AND CO.,
Ouse Chemical Works, SELBY.

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Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

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FIRTH BLAKELEY & CO., Thornhill, DEWSBURY.

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Write the WRIGHT GAS PLANT MANUFACTURING COMPANY, LIMITED, 181, Queen Victoria Street, LONDON E.C.

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A QUANTITY of 6-inch and 9-inch Socket PIPES and SPECIALS. Clean, Strong, and Perfect. About 30 Tons. Will accept £3 5s. per ton to clear.
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GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

TENDERS FOR COAL.

THE Directors of the Sheffield United Gaslight Company invite TENDERS for GAS COAL and NUTS, for delivery during the period ending June 30, 1906. The Tenders to state whether the Coal is screened or unscreened.
Tenders (Forms for which can be obtained on application) must be delivered to the undersigned not later than the first post on Wednesday, the 16th day of August.
The Directors reserve the right to take the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.
HANBURY THOMAS,
General Manager and Secretary.
Commercial Street,
Sheffield, July 28, 1905.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the supply of 830 Tons of OXIDE OF IRON Purifying Material.
Full Particulars may be obtained on application to Mr. William W. Woodward, Engineer, Gas Offices, Bloom Street, Salford.
Sealed Tenders, endorsed "Tender for Oxide," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m. on Thursday, the 17th of August, 1905.
By order,
L. C. EVANS,
Town Clerk.
Town Hall, Salford,
Aug. 3, 1905.

ROBERT DEMPSTER & SONS, Ltd.,
Contractor for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

TO OXIDE OF IRON MERCHANTS.

THE Corporation of Birkenhead are prepared to receive TENDERS for the Supply of about 150 Tons of OXIDE OF IRON for Gas Purification purposes.

Forms of Tender and other Information may be obtained from Mr. T. O. Paterson, Gas Engineer, Gas-Works, Thomas Street.

Tenders, sealed and endorsed "Tender for Oxide of Iron," to be sent to me not later than Five p.m. on Thursday, the 10th of August, 1905.

Deliveries to be made as required on the written instructions of the Gas Engineer.

The Corporation do not bind themselves to accept the lowest or any Tender.

By order,
ALFRED GILL, Town Clerk.

Town Hall, Birkenhead,
Aug. 1, 1905.

SELBY URBAN DISTRICT COUNCIL.
NEW WATER-WORKS.

PUMPING MACHINERY.
CONTRACT No. 6.

TENDERS are hereby invited for the Construction, Delivery, and Erection of Duplicate PUMPING MACHINERY in connection with the above Works, comprising Boilers, Triple-Expansion Engines, Surface Condensers, Force Pumps, Head Gear and Borehole Pumps, with a capacity equal to raising 32,000 gallons per hour under a head of 310 feet.

Copies of the Plans and Specifications will be supplied on application to the Engineers, Mr. Percy Griffith, M.Inst.C.E., 54, Parliament Street, Westminster, S.W., and Mr. Bruce McGregor Gray, Assoc.M.Inst.C.E., Council Offices, Selby, Yorkshire, on payment of £5, which will be returned to all Contractors who shall submit a *bonâ fide* Tender for the work on or before the 28th day of August, 1905.

Tenders must be made on the Form provided and delivered under seal to the undersigned by the date above named. Every Tender must state the periods required respectively for the delivery and the erection of the Machinery, also the guaranteed duty of the Engines.

The Council do not bind themselves to accept the lowest or any Tender.

By order of the Council,
(Signed) J. H. BANTOFT,
Clerk to the Urban District Council.

Council Offices, Selby,
Dated the 25th of July, 1905.

CITY OF BRADFORD.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas Committee of the Bradford Corporation are prepared to receive TENDERS for the supply of best GAS COAL, COBBLES, NUTS, and CANNEL, all to be well screened, dressed, and free from Shale and Pyrites, to be delivered at the several Works of the Corporation during the period of One Year, commencing on the 1st day of October next.

Form of Tender, with any further Information required, may be had on application to Mr. Chas. Wood, Gas Engineer, Town Hall.

Sealed Tenders, endorsed "Tender for Coal," to be sent to me on or before Thursday, the 31st of August next.

The Contracts will be let subject to the Fair-Contracts Clauses of the Corporation, which may be seen at the Town Clerk's Office, and which the accepted Contractors will be required to sign.

The lowest or any Tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
Aug. 5, 1905.

CITY OF BRADFORD.

TENDERS FOR STORES.

THE Gas Committee of the Bradford Corporation are prepared to receive TENDERS for the supply of the following STORES required in their several Departments during a period of One Year ending Sept. 30, 1906—

	Probable quantity required.
Wet and Dry Gas-Meters	
Pipes and Castings	
Wrought-iron Steam Tubing	
Best Merchant Iron and Steel	30 tons.
Charging Shovels	70 dozen.
Oxide Wiskets	25 dozen.
Cotton Waste	60 cwt.
Best Engine Oil	1500 gallons.
Common ditto	1800 gallons.
Cylinder Oil	1000 gallons.
Tarred Gaskin	90 cwt.
Brass Main Gas Cocks	160 dozen.
Weed Brooms	72 dozen.
Best Lime	120 tons.
Copper Lamps	500.
Lamp Irons	300.
Sheet Glass for Street Lamps, 21 oz.	9000 sq. ft
Opal Glass for ditto, 21 oz.	3500 sq. ft.

Samples may be seen at the Mill Street Gas-Works, where Forms of Tender and any further Information required may be obtained.

The Contract will be let subject to the Fair-Contracts Clauses of the Corporation, which may be seen at the Town Clerk's Office, and which the accepted Contractor will be required to sign.

Tenders, endorsed "Tender for Stores," to be sent to me not later than Thursday, Aug. 31.

The lowest or any Tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
Aug. 5, 1905.

IRISH ASSOCIATION of GAS MANAGERS.

THE

ANNUAL MEETING

Of the Association

WILL BE HELD IN THE

Council Chamber, Town Hall, DUNDALK,

ON TUESDAY, AUG. 15, 1905.

The Chair to be taken at 11.30 a.m. by the President, Mr. GEORGE AIRTH, Dundalk.

Business: Report of Committee; Admission of New Members; Election of Office Bearers; President's Address; Reading of Papers, &c.

LIST OF PAPERS TO BE READ.
(The order subject to re-arrangement.)

1. "Description of a Modern Sulphate Plant adapted to a Small Gas-Works." By Mr. C. B. OUTON, Inchicore, Dublin.
2. "The Working of Generator Settings with External Producers." By Mr. D. W. TOOMS, of Fermoy.
3. DISCUSSION: "That, in view of the increase in the day consumption which has taken place of late Years, 60 per cent. of maximum daily output may now be considered sufficient Gasholder storage." To be introduced by Mr. R. B. ANDERSON, Assoc.M.Inst.C.E., London.

On the Invitation of the Directors of the Dundalk Gas Company, the Members will dine together at 6.45 p.m., in the Market House.

JAMES WHIMSTER,
Hon. Secretary.

Gas-Works, Armagh,
Aug. 1, 1905.

HOLYHEAD AND NORTH WALES GAS AND WATER CORPORATION, LIMITED.

THE Directors of the above Corporation invite TENDERS for the supply of COAL to their various works for the coming year.

Tenders, endorsed "Coal Contract," to be addressed to the Chairman and forwarded to the Registered Offices, Gas-Works, Holyhead, not later than the 20th inst.

Particulars may be obtained from the undersigned.

R. T. STODDARD,
Engineer and Manager.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the "Bell" Hotel, Bromley, Kent, on Thursday, the 10th day of August, 1905, at Six o'clock p.m. precisely, to receive the Report of the Directors, the Balance Sheet certified by the Auditors, to declare a Dividend, and to transact generally the business of a General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 24th of July, to the 10th of August, 1905, both days inclusive.

By order of the Board.
HENRY W. AMOS,
Secretary.

Offices: 156, High Street,
Bromley, Kent, July 24, 1905.

NORTH MIDDLESEX GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, London, E.C., on Wednesday, the 23rd day of August inst., at Half-past Three o'clock p.m., to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1905, to declare Dividends, and for other purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 10th to the 23rd of August, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Office: 5, Great Winchester Street,
Old Broad Street, London, E.C., Aug. 4, 1905.

GRAND JUNCTION WATER-WORKS COMPANY.

In the Matter of the Metropolis Water Act, 1902, and in the Matter of the Grand Junction Water-Works Company, in Liquidation.

Whereas the undertaking of the above-named Company was under the above Act transferred to the Metropolitan Water Board on the 24th of June, 1904, subject to all debts, obligations, and liabilities, and the Company are about to apply to the Board of Trade for a Certificate with a view to dissolution—

NOTICE is Hereby Given, that any persons having any CLAIMS against the said Company, which may be payable by them, are hereby required to send the particulars, in writing, of such claims to the undersigned, the Secretary of the Company, on or before the 16th day of October, 1905, after which date the Directors of the Company, as Liquidators, will proceed to distribute the assets of the Company amongst the persons entitled thereto, having regard only to the claims of which they shall then have had notice, and will not be liable to any person of whose debt, claim, or demand they shall not then have had notice.

Dated this 25th day of July, 1905,
J. GOODWIN,
Secretary.

65, South Molton Street,
Brook Street, W.

BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Albion Tavern, Aldersgate Street, in the City of London, on Friday, the 25th day of August, 1905, at Half-past Twelve o'clock in the afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th day of June last, to declare a Dividend, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 12th to the 25th of August, both inclusive.

By order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 30, Gracechurch Street,
London, Aug. 4, 1905.

SOUTHGATE AND DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Offices, 5, Great Winchester Street, Old Broad Street, London, E.C., on Thursday, the 24th day of August inst., at 3.45 o'clock p.m. precisely, to receive the report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1905, to declare Dividends, and for other purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 11th to the 24th of August, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Office, 5, Great Winchester Street,
Old Broad Street, London, E.C., Aug. 4, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

BOOKS AND LEAFLETS

TO BE OBTAINED OF

WALTER KING,
11, BOLT COURT, FLEET STREET, E.C.

THE VALUATION OF GAS, ELECTRICITY, AND WATER-WORKS FOR ASSESSMENT PURPOSES.—Second Edition. By THOMAS NEWBIGGING, M.Inst.C.E., and WILLIAM NEWBIGGING, Assoc.M.Inst.C.E. *Price 5s.*

GAS, OIL, AND AIR ENGINES. — By (the late) BRYAN DONKIN. *Price 25s.*

PRACTICAL PHOTOMETRY: A GUIDE TO THE STUDY OF THE MEASUREMENT OF LIGHT.—By W. J. DIBDIN, F.I.C., F.C.S., late Chemist and Superintending Gas Examiner to the London County Council. *Price 7s. 6d.*

CHEMICAL TECHNOLOGY. — ELECTRIC LIGHTING. By A. G. COOKE, M.A., A.M.Inst.C.E. PHOTOMETRY. W. J. DIBDIN, F.I.C., F.C.S. 1 Vol. *Price 2os.*

COAL TAR AND AMMONIA.—By GEORGE LUNGE, Ph.D. Third Edition. *Price 42s.*

TREATISE ON THE MANUFACTURE OF SULPHURIC ACID.—By GEORGE LUNGE, Ph.D. Third Edition, Vol. I. in Two Parts. *Price 52s. 6d.*

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90, CANNON STREET, E.C.

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effects a great saving of time, labour, and expense.
For Particulars, Price, &c., apply to Mr. EDWARD PRICE, "Langley," Wyke Avenue, WORTHING.

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Rich in Illuminating Power and yield of Gas.
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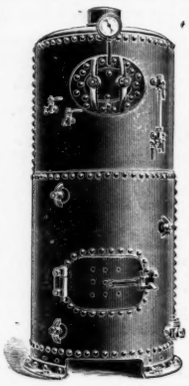
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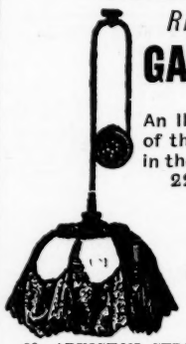
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GAS PENDANT
An Illustrated Description of this Pendant appeared in the "Journal" for Nov. 22, 1904 (page 599).
Write for full Particulars to the
"HANWELL" Pendant Company,
96, ABINGTON STREET, NORTHAMPTON.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
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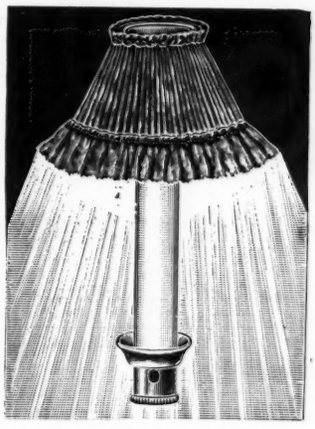

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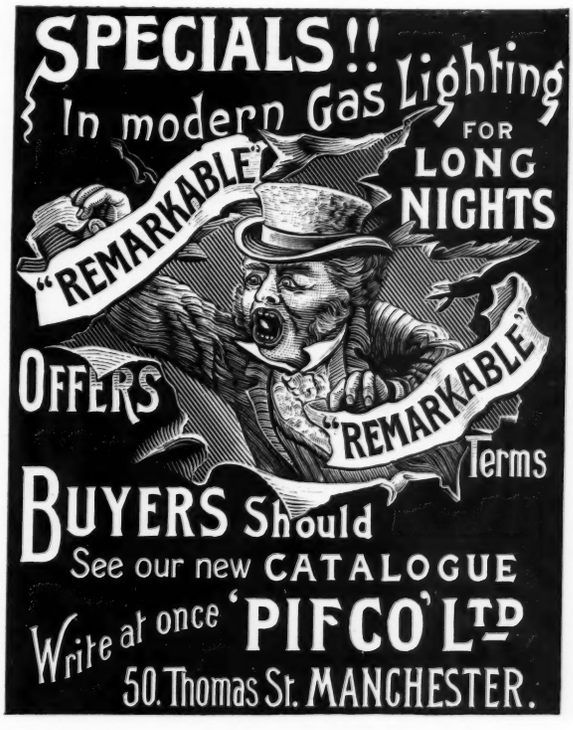

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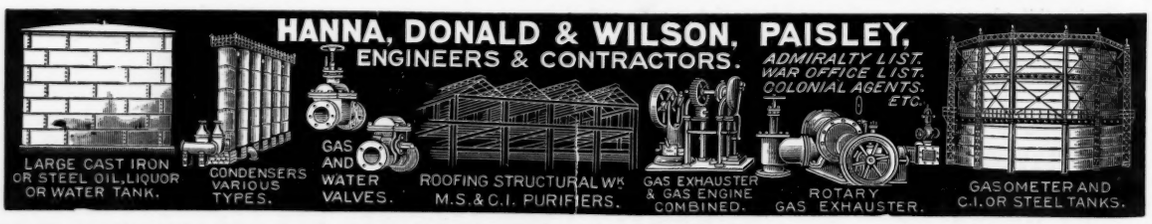
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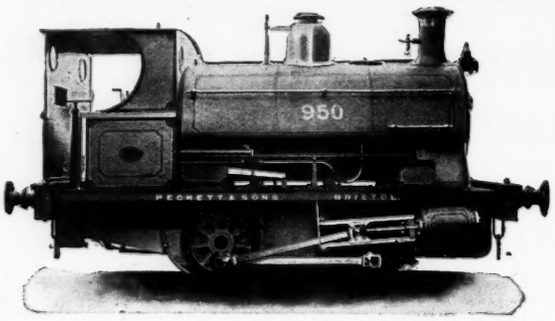

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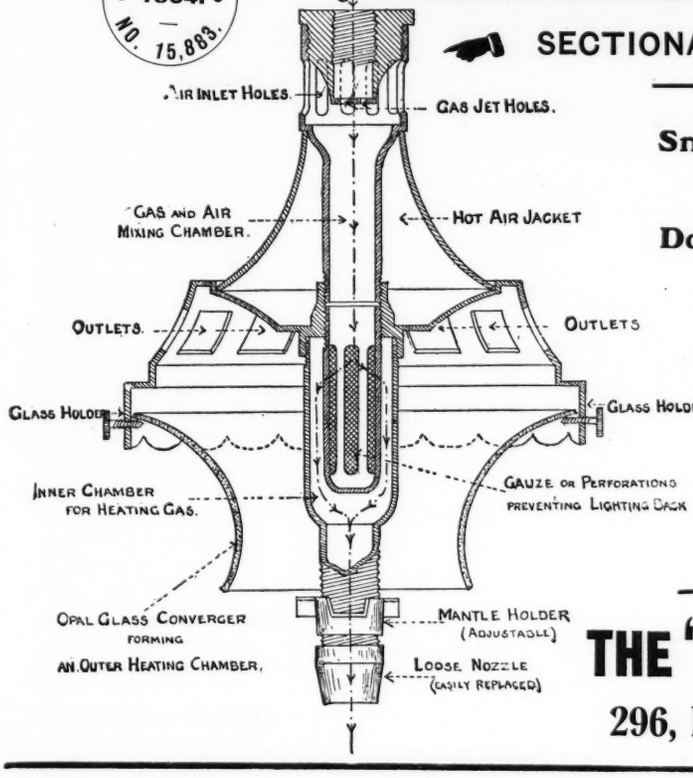

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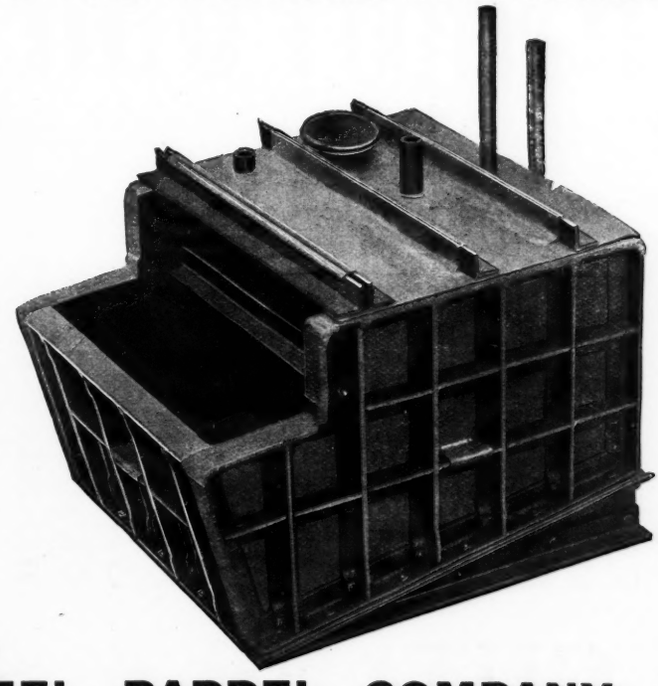

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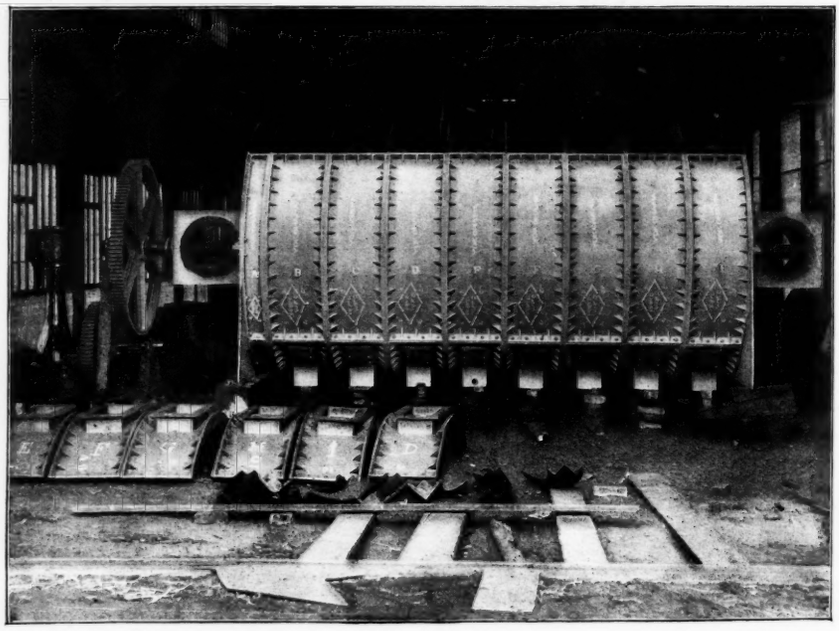

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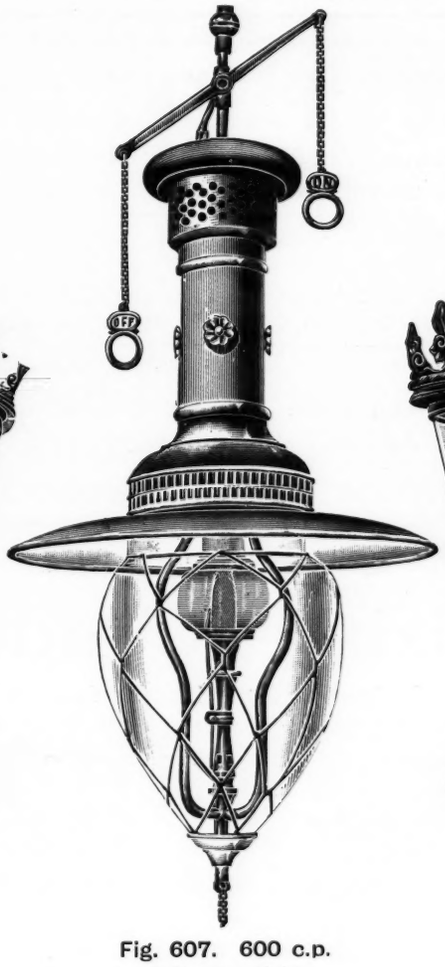

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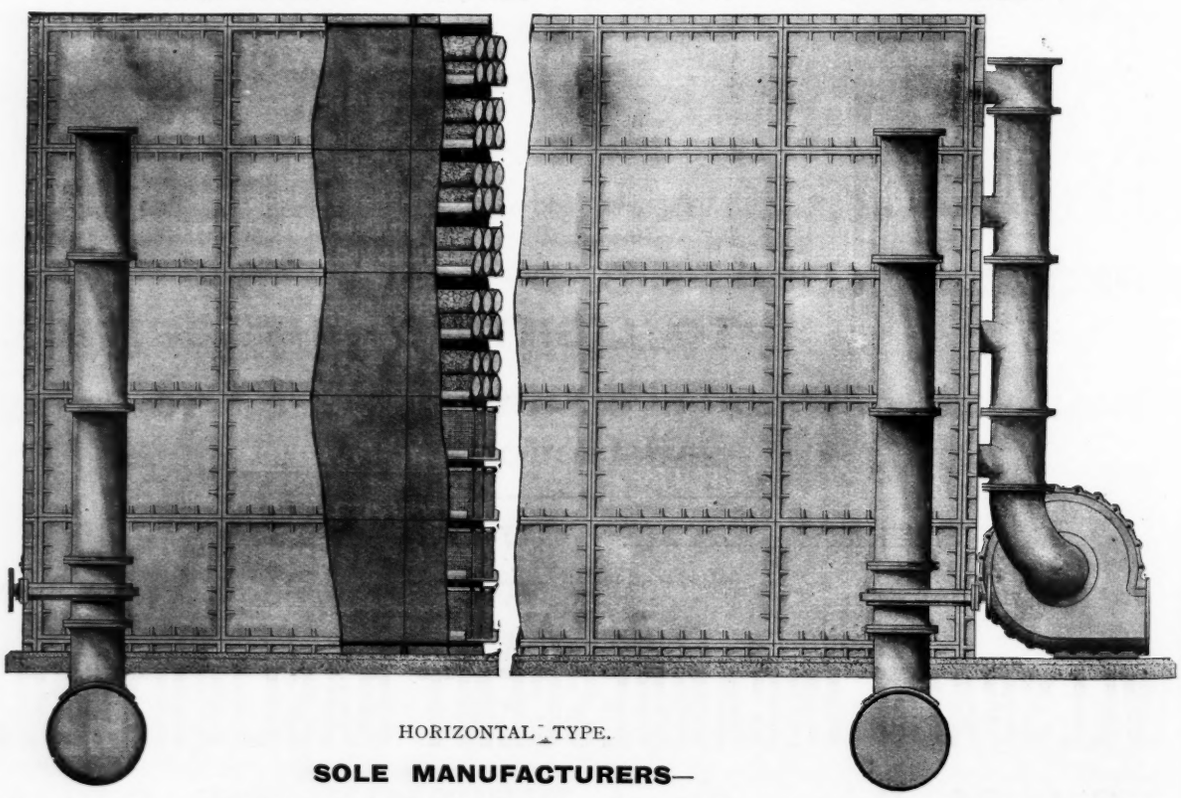

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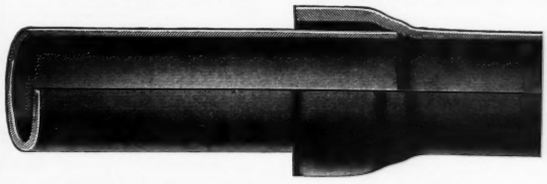

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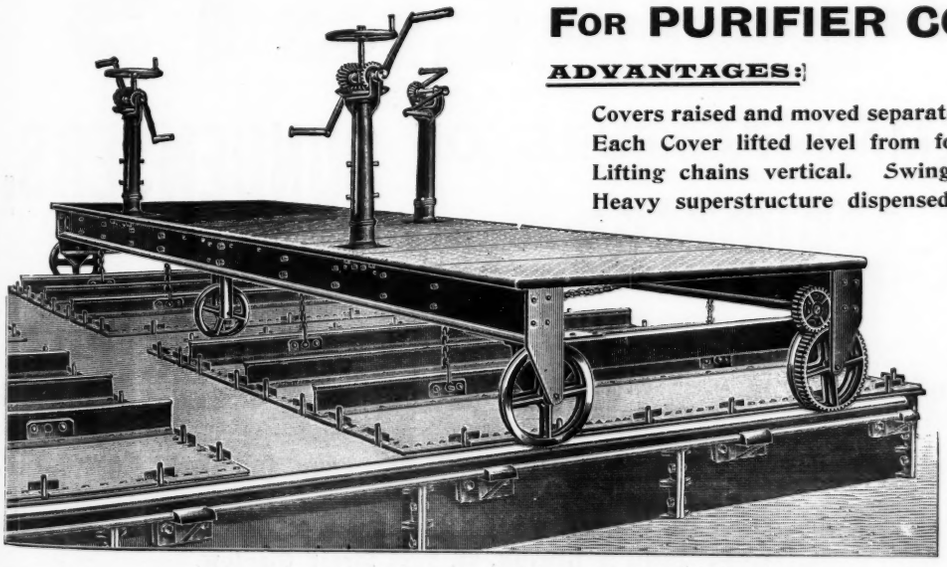

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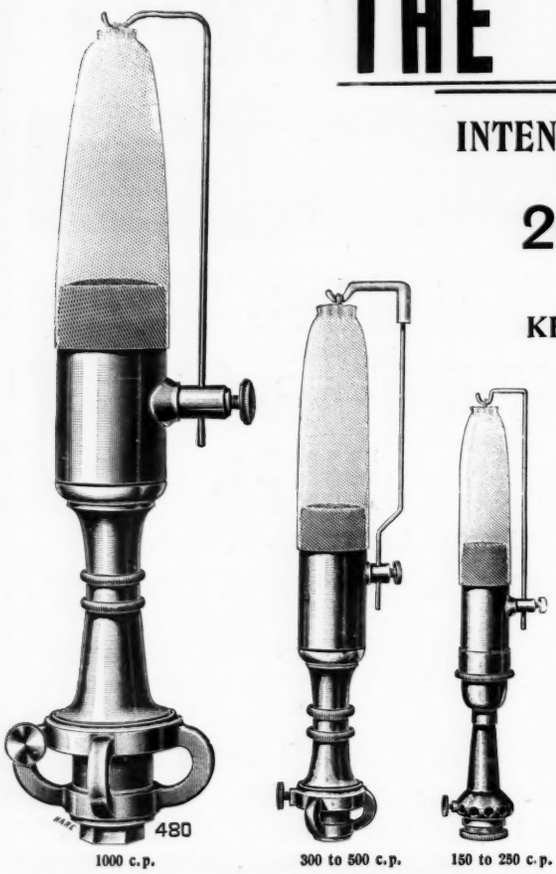

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